THE RUBBER AGE

ESTABLISHED 1917

COVERS ALL PHASES OF THE PRODUCTION AND MARKETING OF CRUDE RUBBER AND THE MANUFACTURE AND DISTRIBUTION OF RUBBER GOODS

Vol. 38 FEBRUARY, 1936 No. 5

INDEX TO CONTENTS

Rubber in the 1936 Automobiles 263
By M. E. Lerner

Chemical Thermodynamics of Rubber 267

Rubber Restriction Holds 268
By A. B. Tatistcheff

Rubber Restriction Wabbles 269
By G. H. Seybold

Hotel Inaugurates "Rubber Room" 271

New Air Spring Suspension 273

Change of Volume of Rubber 274

Rubber Industry Improves Status 275

NuKraft—A Latex-Insulated Hair 276

Report on Alpha- and Beta-Rubber 276

Spraytex—A Sound Deadening Agent 276

Finishing Materials for Rubber 277
By L. J. Lamb

New Equipment Section 278

REGULAR DEPARTMENTS

Late Domestic News	281	**Editorials**	280
Financial News	286	**Chemical Markets**	294
Book Reviews	279	**Statistics**	295
New Goods Section	292	**Market Place**	299
Names in the News	289	**Advertising Index**	304
Rubber, Cotton Markets ...	293	**Classified Ads**	304

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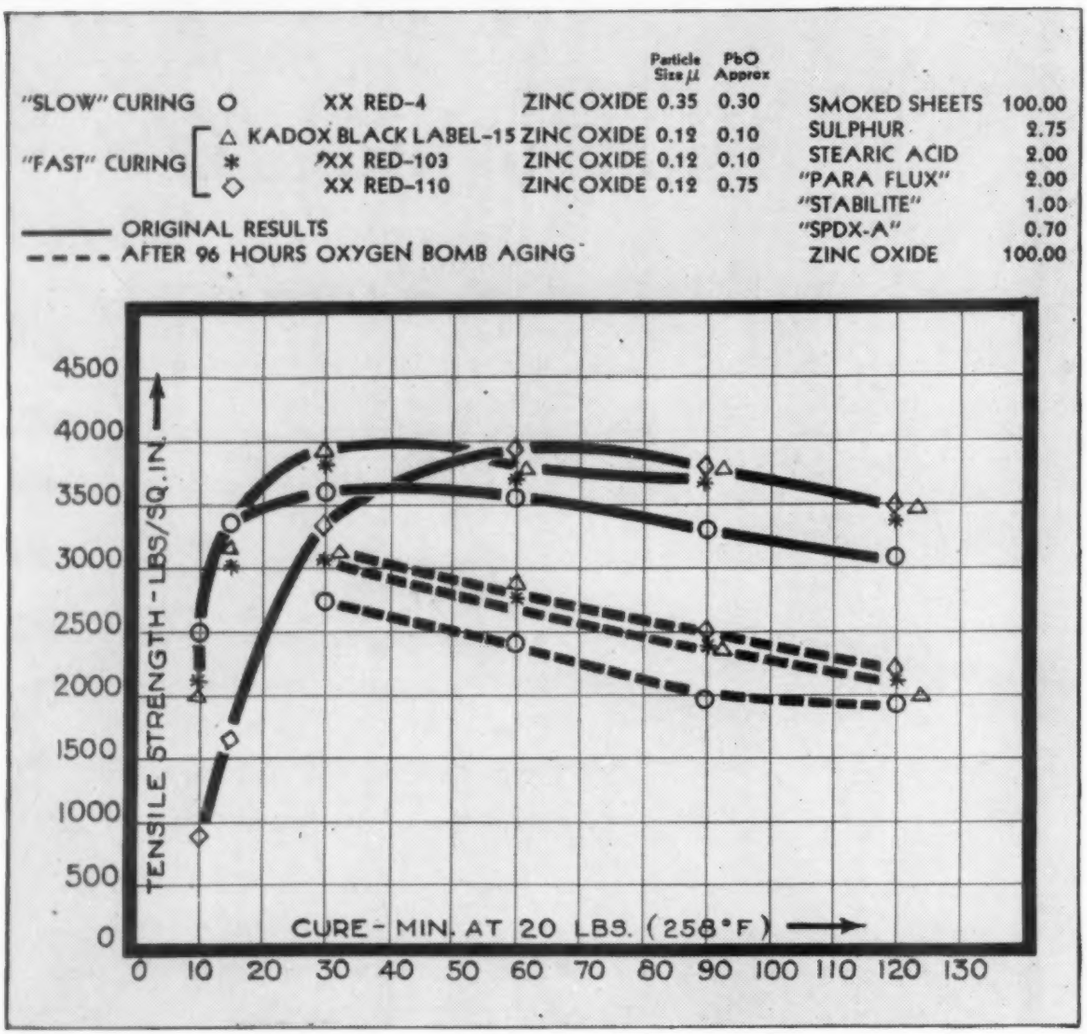

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THE RUBBER AGE

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RUBBER in the 1936 Automobiles

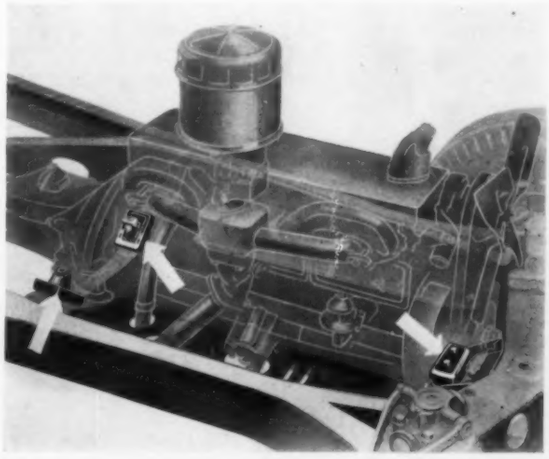
By M. E. Lerner

WITH an increasing trend toward greater riding comfort and safety in operation, rubber continues to play a more important role in automobile construction. The 1936 cars, most of which were first introduced to the public at the recent automobile expositions held in the larger cities throughout the country, bear out this growing importance. The swing toward rubber-cushioned power plants and rubber-cushioned bodies continues upward as more manufacturers recognize the public demand for better protection and insulation against road shock and road noises.

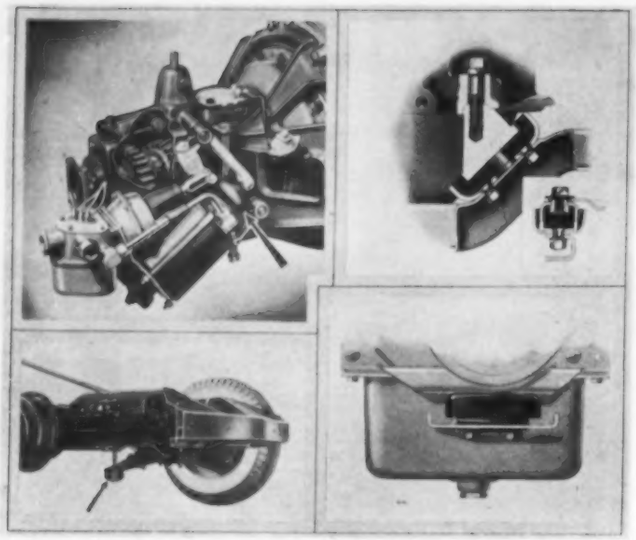
A larger number of the new 1936 cars are featuring rubber parts than those of a year ago. There are more parts made of sponge rubber, an increased use of Dunlopillo cushioning, a wider use of rubber bushings, and the adoption of several parts made of synthetic rubber. More rubber brake pedals and floor mats are being used, several automobiles now using mats for both front and rear compartments. More models are cushioning their springs, either semi-elliptical or coil types, in rubber.

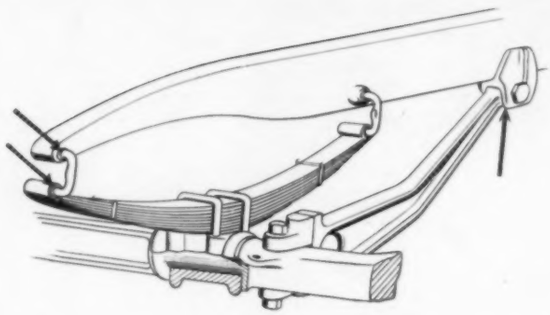
Practically all of the 1936 cars have their engines mounted on rubber. The number of cushionings, or insulators as they are termed in the automotive industry, varies from three to five, depending on the shape and size of the engine. Oldsmobile, Cord and Auburn models are among the lines using tri-cushion suspension. The Reo "Flying Cloud" is flexibly mounted on four cushion supports, as are the Pierce-Arrow models. Among those using five rubber insulators in their power plants are Pontiac, Cadillac, La Salle and Buick.

Where tri-cushioned suspension is used, one insulator is usually located at the front of the engine assembly, the other two in the rear. Termed the most successful means of preventing vibration from reaching the frame and car interior, these insulators, or



Location of the rubber insulators (indicated by arrows) used in the 1936 Oldsmobile tri-cushioned suspension.





ABOVE: Semi-elliptic springs on the new Hudson are cushioned in rubber. LEFT: Upper left: Rubber bellows on the Hudson "Electric Hand." Lower left: Rubber mounting on traverse springing on front end of 1936 Cord. Upper right: Two views of rear engine mounting on new Oldsmobile. Lower right: Front rubber engine mounting on Oldsmobile. Arrows indicate rubber applications.

"bisquits" as they are sometimes called, also permit quiet, uniform operation throughout the entire speed range.

In the new Oldsmobile Six a single-point mounting cushions the engine at the front and is located between the frame front cross-member and the bottom of the timing chain cover. This mounting is made of softer rubber than that of similar mountings used on last year's models in order to dissipate low speed vibration before it is transmitted to the frame or car interior. The two rear mountings have been reallocated and their spread reduced so that they now allow approximately six inches less spread between mountings. The reallocation of these two rear mountings is said to reduce resistance to the rotating tendency of the engine with a decided decrease in torque reaction.

The 1936 Cord, which uses a two-unit chassis construction, has its power unit mounted in rubber on a U-shaped frame, the term "power unit" indicating the engine, power transmission and driving elements, all housed in the front unit of the chassis construction.

In the case of quintuple mounting, as practised by Buick and Pontiac, the engines are supported by insulators at the following points: two at the front, one at each side; two at the flywheel housing, one at each side; and one at the rear of the transmission. These mountings are spaced so as to give maximum stability to the power plants, and are bonded to steel. As a general rule specifications issued by automobile manufacturers to rubber parts makers on these rubber mountings call for a Shore Durometer hardness of approximately 60. Tensile strength of the front mountings used by the Hupp Motor Car Corporation must test to 4,000 lbs. per square inch. The Auburn specification calls for "rubber to be adhered to steel by metallic adhesion with rubber to have 60 Durometer reading." Reo specifications call for the same Durometer hardness. For purposes of identification in the auto plant, the rubber mountings are usually dabbed with a solid color paint or coated with an Egyptian lacquer.

The first big step toward proper car insulation against shocks encountered on the road was inaugurated several years ago with the introduction of rubber-cushioned bodies on automobiles. Through the seasons more and more manufacturers adopted this style of shock prevention. The latest recruits among the phalanx of cars having their bodies cushioned on rubber shims (or pads) are the Chrysler, Plymouth and De Soto models of the Chrysler Corporation. Thick rubber shims are usually inserted between the bodies and the frames, the flexibility so secured holding body rumble, even on cobble-stone pavements, to a minimum. The 1936 Pontiac bodies are mounted on the chassis by 14 body bolts, combination rubber and fibre shims being used in all cases but one where a hard fibre shim is employed. The new Cadillacs have substituted fabric for rubber shims at certain points on a few models where formerly all bolts made use of combination fabric and rubber shims.

Improved insulation against all forms of road noises, as well as dust, dirt and draft, continues to intrigue the automotive engineer. This is prevalent in almost all of the 1936 models, and is accomplished with a wide variety of approach. For instance: rubber floor mats and seals around the clutch and brake pedals in the front compartments of Chrysler, Plymouth and De Soto models have been designed to fit tighter than heretofore; the front rubber floor mat of the new Oldsmobiles has a jute pad backing which heightens insulation possibilities and increases longevity; the steering column opening in the Hudson and Terraplane cars is sealed with rubber grommet foot pedals with soft rubber pads beneath the floor; and the front compartment floor mat of the new Studebaker is of rubber ⅛ of an inch thick beneath which is 7/16 of an inch of fibre insulation.

Composition coatings using rubber as a base have also been put to use for insulation purposes. Every seam and joint throughout the Hudson and Terraplane bodies has a coating of rubber air sealing compound in addition to kersey cloth covering under carpets and pads while special rubber composition sound insulating material is applied to the underside of the fenders on the Cord and Auburn models to eliminate sounds caused by gravel striking the fenders, more noticeable than formerly because of the use of elaborate wind noise reduction devices. The 1936 Cord, incidentally, eliminates running boards, the floor boards being only 10½ inches from the ground.

An outstanding example of the use of rubber in the exterior and interior of 1936 automobiles is furn-

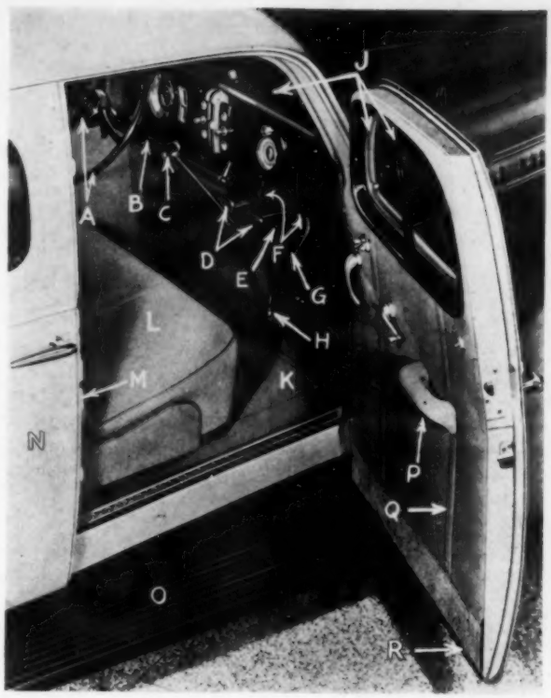
ished by the Olds Motor Works. All of the 14 Oldsmobile Sixes and Eights make liberal use of rubber parts and include several not previously used. The chassis, including engine and driving elements, makes use of the following rubber parts among others: engine mountings, fan belt, upper and lower control arm bumpers, wheel and brake cylinder seals, boots and hose, high tension wire block and covering, battery case, steering wheel and horn button, transmission dome boot, gear shift lever ball, spring pad seats, rear axle bumpers, muffler supports, gas tank strap grommets, tail pipe support, stabilizer bar bushings, and shock absorber link bushings. In this chassis large rubber bumpers located adjacent to the coil springs in the "Balanced Springing" system, an integral part of Oldsmobile's knee-action control, furnish the extra cushioning needed for easy riding when severe bumps are encountered.

Applications in the Front Compartment

Numerous uses of rubber are made in the front compartment of these Oldsmobile models including: clutch and brake pedal covers, door bumpers, floor mat, rubber-base mohair, accelerator cover, starter pedal cover (these models use isolated starter control, the driving controls being isolated from the power plant to prevent direct transmission of noise and vibration to the front compartment), brake and clutch pedal opening seal, sponge rubber arm rests, rubber-cemented trim boards, weather stripping in windshield, windows and ventilator, running board cover, etc. The interior of the Oldsmobile body is sprayed with a material having a rubber base for sound deadening effect prior to trim installation.

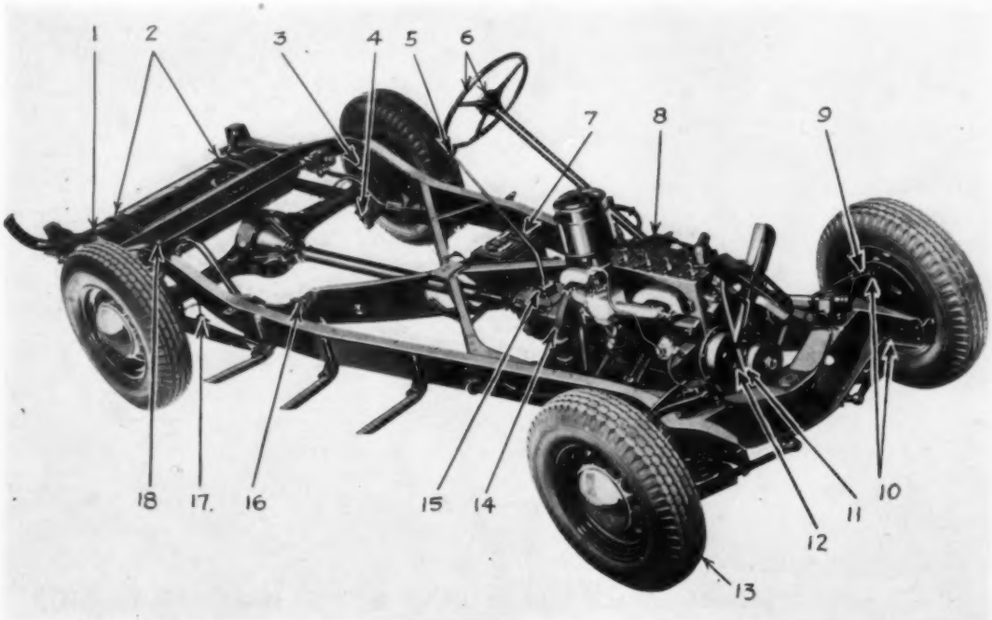
These rubber parts are found on the exterior of the Oldsmobile models: headlamp mounting pad, cowl ventilator seal and drain pipe, windshield wiper blade, rubber trunk seal, gas tank filler neck grommet, rubber shims for mounting body to frame, bumper and fender steps on rumble seat models, and rear rubber deck mats on the business coupe and six-wheel models.

Many of the 1936 cars are using semi-elliptic rear springs, widely spaced and outboard mounted, cushioned in rubber. The rear bushings of springs on Pontiac models are made of Inlox rubber, developed by the company, with rubber further serving to insulate the springs from the axle. Graham-Paige models also use rubber-cushioning in this connection. Where coil front springs are used, as in the case of Oldsmobile, the large rubber bumpers previously described



Rubber in front compartment of the new Oldsmobile:

A—wheel and horn button. B—steering column bracket grommet. C—gear shift ball. D—clutch and brake pedal covers. E—starter pedal cover. F—brake and clutch pedal opening seal. G—accelerator cover. H—transmission dome boot. J—windshield, window and ventilator channels. K—floor mat. L—rubber base mohair. M—door bumpers. N—body sprayed with rubber base material before trim installation. O—running board cover. P—sponge rubber arm rests. Q—trim boards rubber cemented. R—weather stripping.



Rubber in the 1936 Oldsmobile chassis:

1—tail pipe support. 2—gas tank strap grommets. 3—rear axle bumpers. 4—spring seat pads. 5—gear shift ball. 6—steering wheel and horn button. 7—battery case. 8—High tension wire block and covering. 9—wheel and brake cylinder seals, boots and hose. 10—upper and lower arm bumpers. 11—fan belt. 12—engine mounting. 13—tires. 14—engine mounting. 15—transmission dome boot. 16—muffler support. 17—shock absorber link bushings. 18—stabilizer bar bushings.

furnish extra cushioning for severe road shock protection.

Rubber continues to hold favor as the prime covering material for running boards. The 1936 Pontiacs feature new running boards of stream-line design which are rubber-covered and metal reinforced, leaving no painted surfaces exposed to damage. These running boards have thick edges and are of ribbed tread design. A heavily ribbed molded rubber pad covers the entire surface of the running boards used in Oldsmobile models. The rubber extends up at the inner side to the lower edge of the body panels. These boards have a chrome-plated trim strip along their outer edge, furnished as standard equipment, the strips harmonizing with other moldings and serving to accentuate the length of the cars. Provision has been made for mounting radio aerials under the Oldsmobile running boards. Running board rubber mats are used on the Hudson, Terraplane and Reo 1936 models, to mention a few. Cadillac and La Salle cars make use also of a rubber running board stone deflector. The Hudson and Terraplane mats weigh 10 pounds each. Specifications for running board assemblies for Hupmobiles call for "rubber vulcanized to rust-proof steel."

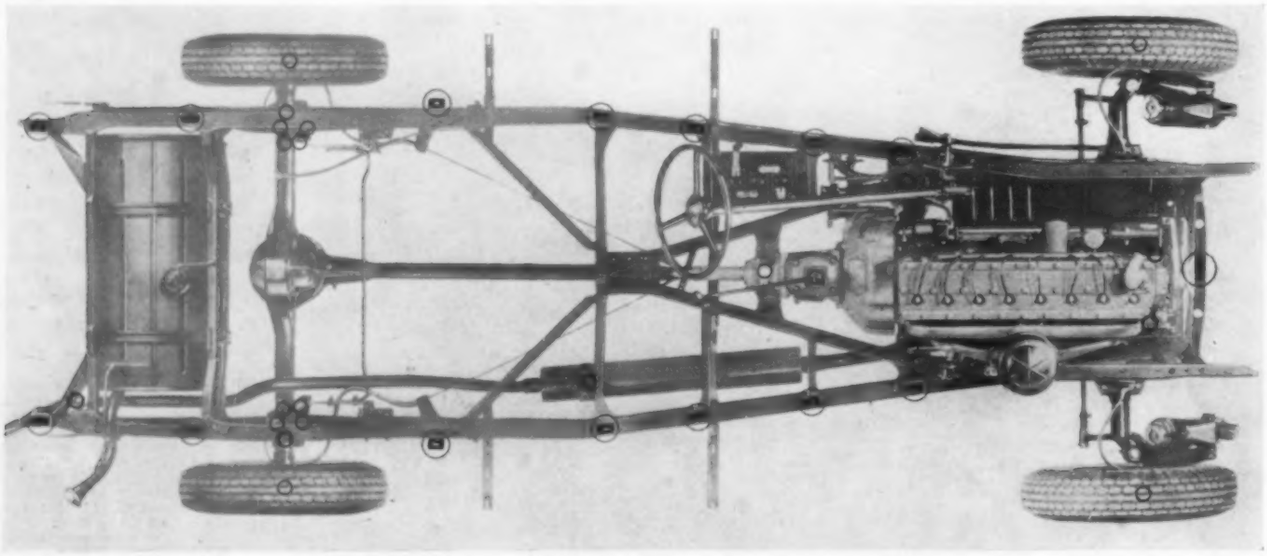
Little change is noted in rubber steering wheels in the 1936 automobiles. The Pontiac steering wheel for 1936 is a 3-spoke, steel-core wheel, covered with molded hard rubber, the diameter having been increased from 17 to 18 inches. The Oldsmobile Six and Eight are equipped with spider type wheels and are finished with a clear lacquer to preserve the rubber.

Sponge rubber parts, particularly arm rests, are appearing in a greater number of cars this year. Among models using sponge rubber arm rests, both of the side and center types, are Cadillac, La Salle, Hupmobile, and others. The first two also are equipped with sponge rubber hassocks and foot rests. Hupp Motor specifications for side and center arm rests call for a sponge rubber with a density of .15 oz. per cubic inch (plus or minus 10%), a 300% elongation before aging, and a 200% minimum elongation after aging. Tensile strength of these arm rests must test to 30 to 40 pounds per square inch before aging, and 25 pounds minimum after aging 72 hours at 158° F. In addition to these applications, many fillers and grommets are being made of sponge rubber, Pontiac models using a sponge rubber seal on coupe deck and rear compartment lids.

Hudson's Radial Safety Control

Not particularly a new use in automobiles, but rather an application in a new automotive principle, is the use of rubber in the "Radial Safety Control" device which features the 1936 Hudsons and Terraplanes. This control derives its advantages from the fact that the front axle in its oscillation, due to inequalities of the road, moves in a true arc in the vertical plane, being held to this path by two drop-forge torque rods, one on each side of the frame of the car fitted to the siderail of the frame. A vertical pivot pin at the front end of the torque rods located in the front axle, and a rubber-bushed pivot bearing on the siderail at the rear end of the torque rods, permits the slight transverse movement of the front axle due to thrust from the wheel. The rubber bushings in the pivot bearings at the rear ends of the torque rods insulate the frame and body from road shock and at the same time maintain accurate control over the action of the front axle.

More attention has been given to front and rear door assemblies this year with rubber again playing its part. Almost all of the 1936 models use a rubber bumper stop and brace inside the doors to support the windows when in a lowered or opened position. Rubber channelling (or "windlacing" as it is being called) is ordinarily employed as protection against wind and weather. One make (Oldsmobile) secures positive sealing of the cowl ventilator by mounting a one-piece rubber gasket, in a groove, in the edge of the ventilator cover, the gasket being pressed against the edge of the cowl ventilator drain trough, in the body cowl, preventing water from collecting under the cover.



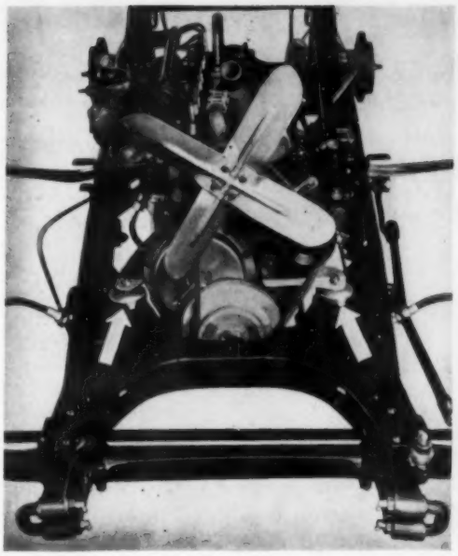
The location of rubber shims, engine mountings, grommets, bushings, shackles, etc., are indicated by the small circles on this 1936 Pontiac chassis, on which bodies are mounted by 14 body bolts, combination rubber and fabric shims being used in all cases but one.

Synthetic rubber parts are beginning to appear as part of internal assemblies. The 1936 Nash again makes use of du Pont's DuPrene in its packingless water pump. This pump has a Bakelite ring around the driveshaft seated against the inner surface of the pump cover plate, the ring being locked in position by a pin through the pump shaft and held tightly against the cover plate by a sleeve made of DuPrene. The sleeve, which is under constant pressure or tension, is impervious to alcohol, oil or other substances that might be present in the water pump. The synthetic rubber sleeve, replacing former metal construction, is molded by the Dryden Rubber Company for Nash.

Spring seats used in the 1936 Pontiac line have furnished another outlet for rubber. Mounted on top of the spring seat caps are rubber bumpers which prevent the springs from striking through the padding when severe road shocks are encountered. These rubber bumpers are easily replaceable and preserve the appearance and comfort possibilities of the front and rear seats for long periods of time. They are cone-shaped.

Additional rubber applications in 1936 automobiles, a shade out of the ordinary, include the use of a sturdy, wing-shaped brace mounted in rubber at the front cross-member of frames supporting radiator and fenders in some models; rubber seals around rear deck lids of trunk racks, most of which are part of the body construction in the new lines; rubber seals and piston cups in connection with hydraulic brake systems, Chevrolet being the latest car model to adopt this type of braking; rubber-bushed attaching links, which require no lubrication, in shock absorbers; etc.

The importance of the automobile to the rubber industry may be realized from a quotation taken from a radio address made over Station WOR on November 9, 1935, by Mr. A. L. Viles, president and general manager of the Rubber Manufacturers Association, as follows: "The automobile might be called the great incentive to the rubber industry and this is emphasized by these facts—more than 80% of the billion dollars of capital poured into the industry is devoted to the production and distribution of parts for the automobile. The same percentage is applicable to nearly 500,000 tons of crude rubber consumed by the industry and approximately 250,000,000 pounds of cotton. Likewise to the long list of chemicals and other necessary ingredients in compounding and curing rubber articles."



Rubber mountings of the "bisquit" type (indicated by arrows) are used on the 1936 Hudsons and Terraplanes.

It is interesting to note with what rapidity automobile models are adopting rubber parts and the increasing number of those parts. The 1936 Plymouths, for instance, have more than 400 rubber parts, a total of over 40 pounds of rubber excluding the Airwheel tires and tubes which weigh approximately 120 pounds alone. This total of 40 pounds of rubber for parts compares with a total of 3 pounds or less found in many cars but a few years ago. In the event that Plymouth produces 500,000 new cars during 1936, in accordance with its expectations, the company will use more than eighty million pounds of rubber.

Research on Chemical Thermodynamics of Rubber

FOR some time the National Bureau of Standards has been conducting a program of research on chemical thermodynamics of rubber at its cryogenic laboratory. A part of these investigations which led to the determinations of the heat capacity, entropy, and free energy of formation of the rubber hydrocarbon is reported in the November, 1935, issue of the *Journal of Research* published by the Bureau.

The heat capacity was measured for the temperature range 47° C. down to —259° C. (14° K.), using an adiabatic calorimeter of the vacuum type. In this temperature range the rubber hydrocarbon may exist in any one of four different forms, depending on the temperature and other circumstances. The points of transition between these forms, as indicated by the heat capacity measurements, were the same as found in a previous investigation on the temperature-volume relations described in the *Journal of Research*, **13**, 414 (1934). The heat absorbed in the transition from the amorphous to the crystalline form at about 11° C. was found to be 16.7 joules per gram. There was no latent heat effect in the transitions at —74° C. from the amorphous I to the amorphous II or from the crystalline I to the crystalline II forms, indicating that these were transitions of the second order.

The heat capacity (specific heat) values increase from 0.064 at —259° C. (14° K.) to 1.990 joules per gram per degree at 47° C. (320° K.). From the heat capacity-temperature relationship the entropy of the rubber hydrocarbon at 25° C. was calculated to be 1.881 joules per gram per degree. By the use of this value and the heat of combustion reported in the *Journal of Research*, **13**, 357 (1934), the thermodynamic potential or free energy of formation of rubber at 25° C. was calculated to be 1,350 ± 100 joules per gram. These quantities may be used in the calculation of other physical constants and also in the prediction of the circumstances under which chemical reactions involving rubber hydrocarbon may take place.

Rubber Restriction Holds

By A. B. Tatistcheff

Chief Statistician, Commodity Exchange, Inc., New York

In This Article the Author Views With Satisfaction the Results of Restriction to Date and Sees It Taking Further Hold This Year

AN interesting experiment in the control of production of an important staple commodity is apparently meeting with at least some measure of success. Rubber is the commodity and the amounts controlled comprise upwards of 90% of the world's total production.

Under an International Agreement in force since June, 1934, the governments of the principal producing territories of the world pledged themselves to abide by the decisions of an International Committee, which, from time to time, would fix amounts that the territories would be permitted to export during the next few months. The International Rubber Regulation Committee's objects as propounded at the time the Agreement was made are:

> "To regulate the production and exports of rubber . . . with the object of reducing existing world stocks to a normal figure, and of adjusting, in an orderly manner, supply to demand, and maintaining a fair and equitable price level, which will be reasonably remunerative to efficient producers."

While during the initial 7 months of operation of the scheme world stocks continued to increase, the trend was reversed sharply during 1935, a reduction of some 100,000 tons having occurred over the 12 month period. World stocks as compiled by the Commodity Exchange are now in the neighborhood of 651,000 tons, as compared with 751,500 tons at the end of 1934 and some 715,000 to 720,000 tons at the start of the Restriction Plan.

Production is being controlled through a restriction placed on the amount each territory is permitted to export during a given period, and by limiting the size of stocks held by producers and dealers inside regulated areas to a certain percentage of their respective export allowances. In determining permissible exports the International Rubber Regulation Committee attempts to regulate the supply of rubber to fit existing demand.

Statistics Show Favorable Position

That the rubber producing territories which have entered into the Agreement have abided by the decisions of the International Committee is well illustrated by recent statistics published by the Commodity Exchange. With the exception of exports from the Netherlands East Indies, shipments in all cases have kept well within permissible amounts. The only exception is furnished by exports from the Netherlands East Indies, which during 1935 have exceeded permissibles by 16,896 tons, as against an allowable excess of some 13,500 tons.

The problem of controlling exports of crude rubber produced by natives in the Netherlands East Indies has apparently been the one major difficulty encountered in the operation of the present Restriction Plan.

Apparently the mistake was made at the outset, and the production capacity of the Netherlands East Indies native rubber growers was underestimated. There is little wonder of this as statistics relating to native rubber were few and far between and available figures on potential production were very incomplete. The work of administering the Restriction Scheme necessitated the compiling of complete and accurate figures, and the amount by which the size of the potential exports of native grown rubber from the Netherlands East Indies was underestimated, soon became apparent.

An attempt was made to curb exports by imposing an export duty but this had little effect. Although his shipments are subject to an export duty of some 9c per pound, which leaves him only 2c to 3c per pound net, the native exporter's methods of production are primitive and allow him to bring the rubber to market at practically no cost to himself. During 1935 exports of native rubber from the Netherlands East Indies exceeded permissibles by 29,683 tons, as against an allowable excess of some 5,628 tons. This excess was somewhat offset by the efforts of estate owners whose exports of plantation rubber fell 12,787 tons short of permissibles.

However, it proved impossible for them to curtail exports sufficiently to offset large native exports entirely, and the Government of the Netherlands East Indies appealed to the International Rubber Regulation Committee, which at a meeting held on December 3, 1935, decided to disregard the excess shipments for the entire territory for 1935. At the same meeting an increase of 57,000 tons in the basic quota allowance was granted the Netherlands East Indies as a whole for the year 1936.

In the meantime surveyors are actively engaged in the registration of native rubber gardens in the Netherlands East Indies. They are divided into 131 counting brigades and are collecting data which is expected to embrace half a million native producers. An idea of the difficulty of gauging potential production by natives may be gained by noting that the work often involves surveying jungle areas, portions of which have rarely, if ever, been visited by white man. The final object is to introduce individual restriction. Exports by each native producer will be limited to a certain fixed amount of the total permissible for a given period, and will probably be apportioned with due regard for the size of each native's potential production. According to latest reports, it is hoped that the individual restriction of exports of native rubber from the Netherlands East Indies will be an accomplished fact by the middle of this year.

Rubber Restriction Wabbles

By G. H. Seybold

Former General Manager of U. S. Rubber's Sumatra Plantations

The Prediction that Restriction Will Intensify Current Problems is Made in this Article from the January 13th issue of Barron's

INTERNATIONAL rubber regulation agreement is a bit groggy from the blows dealt it by the Dutch native producer. Operation of the scheme for the first calendar year of its existence emphasized the difficulties of control rather than solved them. On the credit side of accomplishments are a relative price stability which has eventuated—it cannot be said to have been achieved—and a reduction in world stocks which final figures will probably show has approximated the 100,000 tons aimed at. The basic inequity of the Dutch quota in relation to the British has been inadequately adjusted. The ultimate price objective appears no nearer than it was a year ago, and, as and if it is approached, the difficulties revealed during the past year will be intensified.

Observed from the standpoint of the various interests affected it may be noted, first, that the American consumer has continued to buy his tires below a fair cost at the expense of rubber-manufacturing-company stockholders. The American manufacturer, continuing the game of cut-throat competitive selling practices, may at least congratulate himself on the fact that crude-rubber price fluctuations during the year have been restricted to 5¼ cents.

British and Dutch shareholders in rubber plantations see earnings lower than in 1934, and the future outlook is far from heartening. Allowed to produce only 60% of their standard production, there are very few planting companies that can pay any dividend at all, although many will manage to squeeze out a meager something by foregoing depreciation charges. The effect of the scheme, and one of its unstated and unacknowledged objectives, is preservation of the white man's interest in decrepit and obsolete plantations, which, in conditions of free competition, would be lost in the struggle with the native producer.

Of the governments of producing countries, all those under the British flag have experienced a gratifying increase in revenues from the mere fact that rubber has returned to a price at which it is at least taxable. British Malaya, with one of the soundest tax systems in the world, is again in receipt of flourishing income. The Dutch East Indies is another story.

It has been the object of Dutch policy to tax European producers by an impost on exports as soon as prices reached a figure at which that would be possible. A sliding-scale scheme has been arranged which threatens to take away the last hope of net profit the plantation companies might cherish. On the other hand, the high export tax on native rubber, which is supposed to keep him controlled by discouraging his interest in production, is pouring in large sums which are not available to the general finances of the Government, but which have been promised and allocated to improvement of conditions in the districts from which they are collected. Thus, while the Government is in desperate need of funds, it cannot touch moneys in hand which must be spent in many cases on the equivalent of boondoggling, although many necessary improvements in transportation and sanitation are being carried out.

Despite a chaotic congeries of levies on almost every conceivable article and activity of commerce, the Dutch Colonies seem to be in financial difficulties except in the most prosperous times. Their finances have received no benefit whatever from the increase in the price of rubber from 3 to 15 cents. The problem of native production control was so inherently difficult that the export duties, collected to depress the return to the native, had to be promised as expenditure in his benefit to keep him pacified.

Thus we are brought to consideration of the effect of rubber control on the natives of all countries, and, primarily, those of the Dutch East Indies, because every angle of the restriction problem eventually narrows down to this sector of the producing circle. It is the crux of the entire situation, and on its solution depends the success or failure of the restriction agreement.

Considering the competition between the white man and the native throughout the industry, it is incontrovertible that the native has been allotted a grossly unfair share in permitted production. Exceptions are such countries as Siam and Sarawak, where the white man is not a factor. If the right to produce is contingent on the power to produce, then the acreage in possession of the two groups is the determining factor, because it has been repeatedly shown that the native gets about 50 pounds more out of an acre of rubber than his rival. This is a fact admitted but not shouted from the housetops in controlling rubber circles in the City of London.

Native Dutch Holdings Underestimated

The registration of native rubber owners in the Dutch East Indies has revealed, during its progress the past year, that their holdings are about twice what anyone had estimated. A year ago the best available figures indicated that natives throughout the industry held 4.4 million acres, compared with 3.6 million acres owned by Europeans. If results already in hand continue to show the same trend as registration is completed, the native will really be more predominating than previously estimated with a total of over 6.0 million acres. It is now assured that the relation of the two groups will be at least in the ratio of 60 native to 40 European.

What restriction is doing to the native varies in different countries. In Malaya in 1933, that is, without restriction, the native holdings, classified as those

under 100 acres, produced 219,000 tons out of a total of 460,000, or 47%. To the end of October, 1935, native production is reported by the RGA as 123,000, against 204,000 for large estates, or 37% of the total. On the basis of what he did without control, the native has been compelled to turn over to his European rival and masters 40,000 tons of the supply, which on any equitable basis it was his right to produce. And if it be objected that 1933 was not a fair year to take as a basis, it may be pointed out that the native produced 45.6% of the total back in 1929.

Actual vs. Potential Production

Nobody knows what the possible producing capacity of the Dutch native is. His share has been fixed by government ukase at 71 parts to 100 parts for the European estates, which is roughly 42% to 58%. Prime Minister Colijn has repeatedly asserted that the year 1929 has been taken as a basis because it was "the most favorable year for the native" of the basic years 1929-32. He has also maintained that actual, and not potential, production must be considered, thus refusing to recognize the registration figures showing the injustice of his original position. The entire quota for the Dutch, as adjusted at the last meeting of the international committee, is 499,000 tons for 1936, yet it is now estimated that the potential production of the native alone is near 700,000 tons.

Native production fell after 1929, because the native is better able to adjust himself to low prices. Large numbers of these people have other land available, or other activities to which they devote themselves when they consider rubber prices too low. Many of them, however, have no such resources, and low prices cause them to produce more heavily at low prices in order to secure the same income. Indications are that this group is increasing, because the drastic rise in the export duties in recent months has not served so far to stop the flood of native rubber. To the end of October native rubber has exceeded the assigned quota by 42,000 tons.

Seen broadly, the native's competitive struggle in rubber is of deeper significance than a mere ephemeral phase of an industry supplying one of the world's most essential commodities. It is a racial warfare in the economic field between the indigenous inhabitants of countries climatically inhospitable to the white man and investors who rarely, if ever, see the source of their income. With few exceptions the European is never permanently domiciled in these lands, but controls them through the powers of governments subsisting ultimately on force. Being forced in defense of his financial interests to change the rules of the game of free competition, he is able to, through administrative control, and does, consciously or unconsciously, favor himself. The native's only defense is his enduring ability to underlive, and thus to produce more cheaply. Politically, he is impotent.

Throughout Malaya, Ceylon, and the Dutch East Indies, the large European plantations have been assigned standard production figures equal to or higher than 100% of what they could produce. There are, of course, some exceptions, and especially those estates with areas of buddings or seedlings or high producing power, which have been penalized for being advanced beyond the average of the industry. Most of the sacrifice has been loaded on the back of the Asiatic. In its actual working, restriction, instead of providing a fairly remunerative return to efficient producers, has preserved the unfit and provided a fair return to none.

The problem of the committee in control of operation of the scheme is more difficult than the figures of basic quotas, and the reduction therefrom as fixed for the moment at 60%, would make it appear. The potential production for 1936 is 1,500,000 tons. Total quotas increased by the recent additional allowance to Dutch natives of 56,000 tons are 1,244,000 tons. There is thus a surplus of 306,000 tons before restriction begins which tends to be produced as prices rise. In other words, there is a 20% restriction before, officially, there is any. This is under efficient control everywhere except the Dutch Indies, but until they get every grower's name in a book, and can put a finger on him there, a part of the rubber will flow to the market.

The situation had not been improved in 1935, as it was in 1934, by a fortuitous increase in consumption. Present figures indicate that the increase in the United States will be offset by declines elsewhere, and that the world will use between 900,000 and 920,000 tons. Since supplies will be about 100,000 tons less, the stock reduction decided upon in February will be attained, and it is known that the committee aims at another reduction of 100,000 tons for 1936.

This is attainable only under the price situation that has obtained during 1935. Again the Asiatic producer is the controlling element. The Dutch authorities are proceeding so slowly with registration of native growers that a job that was expected to be completed early in 1936 will not be done until 1937. This means that control through an export duty will have to continue, and that an appreciable rise in prices will again cause over-production of the native quota. Theoretically, there is no limit to the check that may be applied by increasing the duty, but actually there is a real danger of political disturbance. It will be impossible to maintain a price of 15 cents to all other producers and take away all but two cents from that price as the compensation for his efforts to the Dutch native.

The course of the market has been of prime concern to the controlling authorities since the inception of regulation.

Need for New Uses Obvious

As previously observed, the Dutch quota was unfair on the basis of information originally available. That an adjustment would be asked for was foreshadowed by a speech in the Volksraad on February 14 of last year. It was granted in the amount of 56,000 tons at the November meeting. The announcement broke the market down 32 points. An increase that would truly represent the producing power would probably break up the entire scheme. It is a fair prediction that in the three years the agreement has yet to run there will have to be a considerably larger share in production assigned to the Dutch.

Like all plans for establishing prices by producing scarcity, rubber regulation has met with some surprises. It is wobbling, but still on its feet. The outlook for 1936 is for price fluctuations between 11 and 14 cents, for more trouble in the Dutch native sector of production, and for a stock reduction of 100,000 tons unless there is a decided increase in consumption not on the horizon at present. Because of the interests in control, its present inequities, as between the British and Dutch and its injustice to native producers, will continue. What is most needed is a means of consuming 500,000 tons more of rubber annually.

Hotel Inaugurates "Rubber Room"

Colored Murals of Rubber Flooring Stock One of Several Innovations

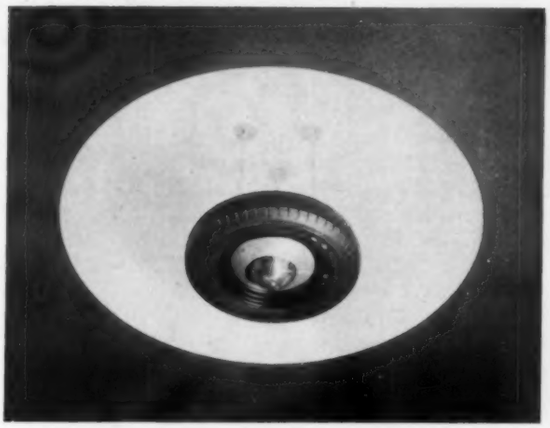
RUBBER has been considered a good utilitarian commodity ever since the introduction of materials which eliminated its tendencies to deteriorate and turned it into a product that would stand up well under all forms of abuse. It has not, however, been given much recognition as an artistic medium although there have been a few murals painted on rubber. Therefore, the opening of the "Rubber Room" in the Hotel Portage, one of Akron's leading hostelries, is more than the mere opening of another cocktail lounge, but rather presages the opening of a new channel of distribution for rubber products.

Deciding to add a cocktail lounge to the other conveniences of his hotel, S. R. Real, proprietor, sought a motif that would distinguish this lounge from those maintained by competition in Akron and its suburbs. Since Akron is the "rubber manufacturing center of the world," and since rubber is the backbone of the city's industrial life, he reasoned, and rightly so, that it was high time that rubber received some definite form of recognition. As a result of this decision, Mr. Real commissioned Kenneth C. Welch, of Grand Rapids, Michigan, an architect of note, to draw up plans for America's first "Rubber Room."

Just how thoroughly the rubber theme was carried out by the management of the Portage may be realized from the fact that approximately four tons of rubber were consumed in the construction of the parts and fixtures in the new cocktail lounge, and that in addition to floors, table tops, bar, bar facing, wainscoting and doors, even the classic murals depicting important events associated with the rubber industry on the walls are made of rubber flooring material.

The outstanding note in the lounge is the murals which serve as a decorative theme and which are placed above the cocktail bar and along the walls. Rubber for the murals was produced by Goodyear in the form of large sheets made of the same compound

Rubber mural, rubber-topped tables, rubber-covered chairs—even rubber encircled ash trays on each table.



Close-up view of one of six rubber tire chandeliers which suspend from the ceiling of the Portage's "Rubber Room."

used in the better grade of Goodyear rubber flooring. From original drawings prepared by Ivor Johns, a Cleveland artist, thousands of pieces of rubber in eleven different colors were used to construct the original creations. The murals were constructed by the following method:

From the original drawings, produced on a greatly reduced scale, in the colors required for the finished work, duplicates were made and projected to the size desired for the walls. The duplicates were made in charcoal outlines on heavy wrapping paper with the various patches of color indicated by code numbers, each shade of red given a different number than was given the various shades of green, blue, brown, etc.

After the charcoal drawings were coded, each numbered section, representing a specified area of a given color, was cut out of the heavy wrapping paper and used as a pattern for cutting out the rubber flooring material used in the finished work. Each area of color tone in the finished murals, therefore, is a distinct and separate piece of rubber. So well are the thousands of pieces of colored rubber fitted together, however, that the joints actually blend to the advantage of the finished effect.

Goodyear rubber flooring used in the making of the murals was one-eighth-inch thick and although the material consists of the durable type of compound specifically developed for floor covering purposes, it is understood to be cut readily into any desired shape with the aid of a small mechanical knife. The murals were prepared for erection in their specified positions in the cocktail lounge of the Portage by being assembled and mounted with rubber cement on fibre board. In this manner the pictures were put into position as finished murals and can be handled as complete units which would not be possible if the separate rubber pieces had been assembled on the walls themselves.

To Proprietor Real credit is given for the idea of producing murals in various colors of compounded rubber. This is the first case on record of this method

being used. The advantages of assembling murals along these lines are many and should lead to a broadened use of rubber murals for decorative effects in both industrial and social life. They may be cleaned as frequently as desired or necessary without danger of damage. In the event that any part or section of the murals become marred or scratched or disfigured in some manner, shape or form, replacement of the damaged area is a simple matter.

Construction of the murals, six in all, was accomplished under the supervision of Artist Johns. They represent rubber and cotton plantation scenes, research laboratories, manufacturing methods, tapping, and such historical scenes as the discovery of vulcanization by Charles Goodyear. With the aid of indirect lighting, striking color effects are secured.

Goodrich rubber tile, installed by the Akron Floors Company, completely covers the floor surface of the "Rubber Room." Even here an unusual effect was created by a colorful and unique floor design secured by inlaying a series of figures which represent the various products of the rubber industry including boots, hot water bottles and transmission drives. In this manner three separate classifications of the industry are recognizable, i.e., footwear, drug sundries and mechanical rubber goods.

The bar, featured by a concave front, is paneled with a rubber sheet and has a rubber-covered surface. Goodyear paneling was used in this instance, with installation performed by the Akron Floors Company.

Rubber wainscoting runs all around the room and all doors are partially covered with rubber. Architect Welch added another distinctive touch to this cocktail lounge by capping the wainscoting supplied by Goodyear with a green molding made from half-sections of Goodrich "Garden Club" hose.

NuKraft Used Extensively

The stools and chairs are all upholstered with NuKraft, the latex-impregnated hair cloth fabricated into a series of small figure 8 springs. This cloth is in turn covered with a rubber fabric resembling brown suede. These seats were manufactured by the B. L. Marble Chair Company, of Bedford, Ohio, with NuKraft furnished by Goodrich and rubber fabric supplied by the Hood Rubber Company. The settees, or booths, using the same materials, were manufactured by the Brower Furniture Company, Grand Rapids, Michigan.

Full view of the "Rubber Room" showing the rubber-covered bar, rubber flooring, rubber-covered upholstery, etc.

A corner of the new cocktail lounge with huge mural scene. The settees are upholstered with latex-impregnated hair.

The central lighting fixtures consist of six automobile tires, each representing one of Akron's leading tire manufacturers. The tires are mounted on disc wheels and are suspended from the ceiling, each being grooved to furnish indirect lighting effects. Miniature rubber tires also encircle the ash trays placed on all of the rubber-topped tables.

In order to be consistent, Proprietor Real issued invitations printed on rubber for the informal opening of the "Rubber Room."

According to Goodyear, the rubber used to create this unusual landmark would be sufficient to use in the manufacture of no less than 666 tires for cars of the popular priced variety. In other words, 133 automobiles would require no more rubber to come forth from their respective factories equipped with five tires each.

Although the "Rubber Room" of the Hotel Portage was designed primarily for novelty appeal, with several of the larger Akron rubber factories lending a willing hand, it incorporates many practical features for the hotel and restaurant industry. The Portage, itself, has accomplished its proprietor's aim, viz: the "Rubber Room" is established as a natural attraction in the city where rubber is the chief stock in trade.

A Low-Viscosity Tornesit

THE development of a new low-viscosity type of Tornesit, the chlorinated rubber manufactured by the Hercules Powder Company, Wilmington, Delaware, broadens the field for this material since it can be sprayed in this form. The development emphasizes the advantages of Tornesit as a protective coating base, particularly in paints, since it is possible to spray a Tornesit concentration in xylol of 24%. The new low-viscosity Tornesit can be formulated into both an acid- and an alkali-resisting coating. Previous to this development the chlorinated rubber product presented a difficult spraying problem since it could only be sprayed in concentrations up to 12% which meant a solution viscosity of 35 to 40 centipoises compared to lacquer spraying viscosity of 75 centipoises. With the sprayable material the solution viscosity is approximately 75 centipoises and has the additional advantage of being more easily brushed.

Firestone Introduces

New Air Spring Suspension

ANOTHER step forward in the insulating of automobiles to provide passengers with an "easier ride" is seen in an entirely new principle of automobile suspension developed by Roy W. Brown, research engineer, Firestone Tire & Rubber Company, which was recently introduced before the annual meeting of the Society of Automotive Engineers, at Detroit. The new principle provides for rubber inflated with air to replace the "buggy springs" now in use and would literally permit the automobile to "ride on air."

Briefly, the Firestone Air Spring consists of an especially developed rubberized fabric bellows which is inflated with air to carry any desired load. The bellows operates automatically in conjunction with an air reservoir by means of a pendulum shock absorption valve. The air reservoir and the bellows are connected by metal tubing (see illustrations).

The principle of the Air Spring lies in the action of a pendulum-shock absorption valve which swings outwardly when the car is rounding a turn, permitting a valve disk to close the passage to an air reservoir. This action is said to effectively increase the pressure in the bellows as the additional load, caused by turning, is applied. When the pendulum is vertical the passage of air from the bellows to the reservoir is unrestricted because the tip of the pendulum engages an extension on the valve disk, thus holding it open. After the wheels pass over a road obstruction the bellows extend, reducing the pressure. The air flow from the reservoir to the bellows is restricted providing desired shock absorption action. Where the Air Spring is utilized the suspension unit is mounted more nearly at the level of the center of gravity, in this manner reducing the tendency of the automobile body to roll when rounding curves.

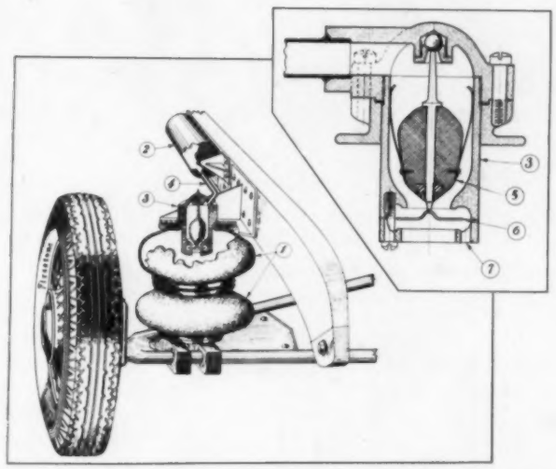
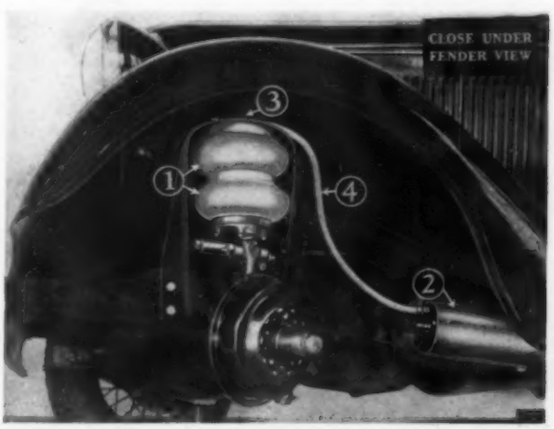


Illustration at lower left shows assembly of the Air Spring, the numbers referring to parts shown in illustration in adjacent column. The outline of the shock absorption valve (upper right) shows the pendulum (5) which swings outwardly when the car is rounding a curve permitting the valve disk (6) to close upwardly. Return of air from the reservoir results when the valve disk closes outwardly, directing the flow through the restricted part (7).



Installation view of the Firestone Air Spring consisting of a rubberized air bellows (1) which operates automatically in conjunction with an air reservoir (2) by means of a pendulum shock absorption valve (3), the bellows and reservoir being connected by a metal tube arrangement (4).

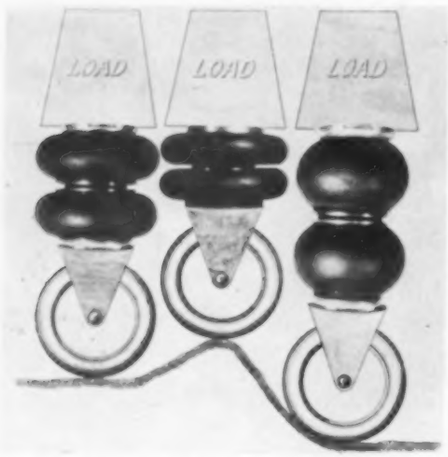
The load on linkage bearings is also said to be relieved by the method of mounting the Air Spring which transfers the major portion of the load on the car's knuckle forging. Transferring this weight in the manner described also makes for reduced wearing and lubrication difficulties, according to Engineer Brown.

Static rate characteristics of the various automobile models now in use may be determined by the size reservoir used with each Air Spring, the dynamic rate characteristics of which can be varied over and above other types of springs by restricting the passage between the bellows and the reservoir. This can also be accomplished by inertia, velocity or remote manually operated valves whichever method best fits the particular job on hand.

According to information revealed by Mr. Brown in his Detroit address, the development of a serviceable bellows proved a difficult problem in the application of rubber. The bellows finally devised is said to withstand 8 million, two inch deformations, under 25% overload. Road tests have indicated flexing life appreciably beyond that demanded for automobile suspensions.

The Air Spring bellows with means of attachment to the axle weighs approximately two pounds per

wheel, which compares with from 10 to 55 pounds for steel springs. Since light unsprung weight has become a necessity due to present day driving conditions, this weight differential results in a decided advantage to the new suspension device.



Deflation and inflation of the rubberized bellows when the car hits a bumpy section.

Actual application of the Air Spring has been made on the Stout "Scarab," in which the outstanding wheel positioning mechanism enabled installation of the bellows in the engine compartment high up in reference to the center of gravity which resulted in good stability and shock absorption properties. On rear axles of the solid type the bellows may be installed directly between the axle and the frame member or offset either to the front or rear of the axles as desired. The axle, however, must be mechanically located in a horizontal plane which, as mentioned above, is rapidly becoming a necessity for other reasons. Characteristics of wheel positioning mechanisms is dependent largely upon chassis design.

Among the improvements to be brought about by utilization of the Air Spring, according to Engineer Brown, are the following: easier riding with less fatigue to the passenger; practical elimination of body roll when rounding corners at high speed; easing the effect of road irregularities on passengers by shock absorption control; facilities for controlling the softness of riding quality; and provision for quieter operation. In describing his invention, Mr. Brown stated that "Air Springs are as different from metal springs and their necessary accessory equipment as balloon tires are from the old-fashioned hard rubber buggy tires."

Bakelite Resin-Rubber Combination

NEW resin-rubber combinations, used in the manufacture of brake linings, clutch facings, and similar products, have been introduced by the Bakelite Corporation, Bound Brook, N. J. Heat resistance is enhanced in these new products by producing sections consisting of asbestos filled material bonded with a combination of two parts rubber and one part of Bakelite resin. Thermoplasticity at high temperatures, such as 400° F., is said to have been greatly minimized. Wear resistance at such temperatures is also said to have been improved.

Change of Volume of Rubber

WHEN rubber is stretched isothermally at ordinary temperatures the volume remains constant at low elongations, but as the stretching is continued a critical point is reached at which the volume begins to decrease. Above this point, the greater the elongation, the more rapidly does the volume decrease. When a sample is held at a definite elongation above the critical point it may be observed that the shrinkage in volume is not an instantaneous process but proceeds at a diminishing rate with time. An investigation is now in progress at the Bureau of Standards, according to the January, 1936, issue of the *Technical News Bulletin,* published by the Bureau, in which precise measurements are being made of the change in volume in relation to the elongation, the temperature, and the time during which the rubber is kept stretched.

The critical elongation at which the volume of the rubber begins to change is greater the higher the temperature. At 0° C. it is approximately 200%; at 25°, 400%; at 60°, 500%; while at 70° C. no change of volume was observed for elongation up to 600%.

Experiments with samples of rubber stretched to definite elongations have been conducted for periods of several weeks without reaching a constant volume. Typical results on one sample of rubber stretched to 600% elongation at 25° C. and maintained in this stretched condition at 25° C. are as follows:

	Time	*Relative volume*
Before stretching		1.0000
After stretching	5 sec.	.9935
	30 sec.	.9912
	1 min.	.9901
	1 hr.	.9881
	1 day	.9865
	7 days	.9852
	21 days	.9847

The volume at the end of 3 weeks was still changing a little from day to day, and it appears that a very long time would be required for the limit to be reached. The present data do not suffice for any reliable estimation of the limit by extrapolation.

Experiments were also conducted to determine the effect of changing the temperature of stretched rubber. The results showed that the volume coefficient of expansion of the stretched rubber is greater than that of the unstretched. They also indicated that the behavior of stretched rubber is dependent in large measure on the temperature at which it is stretched. For example, a sample of rubber stretched at 25° C. and cooled to 0° C. exhibits very different behavior from one initially stretched at 0° C.

Most of this investigation is being conducted with soft, vulcanized rubber made according to simple formulas such as the following:

Ingredient	*Parts, by weight*
Rubber	100
Sulfur	2
Zinc oxide (Kadox)	1
Mercaptobenzothiazole	1
Stearic acid	1

When rubber compounds containing fillers are stretched, the decrease in volume of the rubber phase may be masked by a large increase in volume resulting from the formation of vacuoles around the filler particles.

Rubber Industry Improves Status

Survey Reveals 1935 Production and Distribution Closed with Some Sizeable Gains over Similar Divisions in 1934

CONSTANT improvements in both production and distribution of rubber products in the last half of 1935, following declines recorded for both divisions during most of the first six months, enabled 1935 to close with sizeable gains over 1934, according to a survey recently completed by Dun and Bradstreet, Inc. One of the most encouraging developments in the rubber industry was the increase of crude rubber consumption in the United States to a new high, surpassing that of 1929, the previous peak year, by 6.4%. (Consumption figures for 1935 will be found elsewhere in this issue.—EDITOR).

Tire Production Exceeded 1934 by 4%

Overcoming the decline that was set down for the first six months from the 1934 total, production of automobile tires recovered sufficiently to exceed the previous year's by more than 4%, with an estimated output of 49,000,000 to 50,000,000 tires. Inventories of tires at the end of August were reduced to the smallest total in twenty-two months.

An outstanding change in the industry during 1935 was the adoption of a cooperative price stabilization program by the automobile tire manufacturers, which was put into effect early in November. The purpose of this plan was to ban completely all special and excessive discounts. Industrial expansion and greater demand from the automobile field are being counted upon to lift both production and distribution during 1936.

Production in nearly all divisions of the rubber goods industry for 1935 ran to larger totals than for 1934, but in nearly every instance the increase was due to the rapid upswing during the last six months of the year. While the output of mechanical goods exceeded the previous year's comparative for every month, plants manufacturing sundries, surgical and druggists' supplies, and household goods achieved their increase of 5 to 10% over 1934 with the gains made from June to December.

Due to the declines recorded for every month, with the exception of January and February, production of automobile tires for the first half of 1935 was 3.9% below the 1934 total. The recovery that started in July, however, brought the total for the ten months to 41,315,000 tires (pneumatic casings), which was 3.8% larger than the 1934 comparative, and 5.4 and 15.4% more than in 1933 and 1932, respectively. It was 5.2% below the 1931 total of 43,596,000.

For the twelve months of 1935, output of tires was estimated at between 49,000,000 to 50,000,000 units, or a gain of around 4% over 1934, and the largest since 1931. Inventories of tires on October 31, 1935, amounted to 8,291,000, which compared with 8,657,000 on the same date in 1934. While inventories at the beginning of the year were 9,455,000, these reached a high in 1935 at 11,675,000 in March and a low at 7,805,000 in August.

Nearly all of the increases in consumption occurred during the last half of 1935. During the first six months only the February figure was higher than the comparative one in 1934. Starting with June, however, consumption in every ensuing month exceeded the previous year's, with the widest gain set down for October at 35.8%. While December consumption of 42,942 long tons was under the year's high of 47,103 in January, it was a new record for that month.

The rapid recovery of the rubber goods industry during the last half of 1935 has prompted trade estimates to set 1936 crude consumption by United States manufacturers at 550,000 long tons. It generally is held, however, that the total will be surpassed, in view of the huge market available in tire application to farm vehicles.

Numerous price concessions were made during 1935 on staple rubber products as well as novelties, in order to move cumbersome inventories, and at the beginning of 1936 the unsettled price situation continued a retardative factor in the broadening trend of sales. Prices of rubber footwear were stabilized by an agreement among wholesalers, but on mechanical rubber goods selling prices did not compensate the higher production costs, due to competitive conditions.

After four years of price-cutting, preferred discounts, and unprofitable consumer inducement schemes, the four major tire manufacturers reached a definite agreement on prices and dealer discount practices on November 1, 1935. By this agreement prices were restored to 90% of the 1934 level, and dealer discounts to large customers were lowered 2½%.

This is one of the most important steps ever taken by the tire division to straighten out its complex marketing problems and to end the prolonged siege of underselling, which caused such widespread price wars last Summer. By narrowing the profit margin, dealers will be placed in a position where price-slashing will become less lucrative, if not impossible, thus assisting in stabilizing the market.

Bankruptcies Set a New All-Time Low

Bankruptcies in the rubber goods industry in 1935 set a new low, as the combined number of manufacturers, wholesalers, and retailers was only 5. This contrasted with 7 in 1934 and 26 in 1932, when the all-time high was established. The defaulted indebtedness, however, made a less favorable showing, as the total increased to $172,957 from $86,361 for 1934, a gain of 100.3%, but was smaller by 92.0% than the peak reached at $2,164,270 in 1931.

Nukraft—A Latex-Insulated Hair Cloth

INTENDED for use as a spring decking in the construction of furniture, railway, bus, automobile and theatre seats, as well as mattresses, the B. F. Goodrich Company, Akron, has introduced a new upholstery material termed "Nukraft." The material

consists of a hair cloth, insulated with latex, fabricated into loops forming a structure of figure eight springs. The hair is thoroughly sterilized, each strand being coated with a specially compounded latex for age-resistance. In application Nukraft is applied in two-ply thickness directly over the burlap covered spring unit (as indicated in the accompanying illustration) with a thin layer of cotton on top. The latex-insulated material "locks" the cotton in place, preventing shifting and bunching, thus making possible a permanently smooth seat through which the springs cannot be detected. Because of its fabrication in loops, Nukraft permits continuous air circulation irrespective of the amount of pressure applied assuring proper ventilation, an essential to seating comfort. This loop fabrication serves to enhance the natural resiliency of both the hair and the latex.

Report on Alpha- and Beta-Rubber

AN INTERESTING report on α- and β-rubber was presented recently by Paul Bary before a meeting of the Belgian Association of Rubber Technicians. In 1925, Feuchter, who is associated with the first systematic experiments on the diffusion of rubber in solvents, established the existence of two kinds of rubber, one difficultly fusible in solvents and the other non-diffusible. According to the December 20th, 1935, News Edition of *Industrial and Engineering Chemistry*, Bary's research has shown that the most diffusible substance which he terms α-rubber, varies in its proportionate quantitative relationship to β-rubber (the less diffusible portion) according to the age of the rubber and to the thermal and mechanical manipulation to which it has been subjected.

Bary's conclusions, as rendered before the Belgian group, are as follows: the principal properties of natural rubber are derived from its complex character. The hydrocarbons which constitute almost the entire mass must of necessity assume a special structure which gives the substance the characteristics of a jelly. In order to satisfy this condition the substance must contain compounds to promote the formation of condensation polymers which will constitute β-rubber and compounds capable of acting as solvents which limit the length of the molecules of α-rubber.

This complex constitution is doubtless what is lacking in certain substances analogous to rubber, such as gutta-percha, balata, guayule, etc., depriving them of the properties of rubber and of its adaptability to vulcanization. Perhaps it is also the condition in synthetic rubber which is not fulfilled to a degree sufficient to produce substances truly comparable to natural rubber.

Spraytex—A Sound Deadening Agent

DEVELOPED for the purpose of dampening the vibrations of metal and similar materials which produce noise, Spraytex is being featured by the Monroe Auto Equipment Company, Monroe, Michigan. It is a fluid vehicle supporting a large number of cellular granules which when applied and dried becomes a homogeneous mass of air cells surrounded by a pliable film of asphaltic binder containing sufficient plasticizers to insure its continued plasticity with age. A percentage of emulsified rubber cement is used in its composition.

As its name implies, Spraytex is ordinarily applied with a deadener type spray-gun, its chief application being on the interior of automobile bodies, although it may also be applied on the exposed metal parts on the under-side of automobiles to reduce road noises and to prevent stone bruises on fenders and other sheet metal parts. A ¼ to ⅜-inch thickness is recommended by its manufacturers for best results. At 70° F. Spraytex will dry to the touch in 30 to 45 minutes, and will be completely dry in 8 to 24 hours depending on the thickness of the applied coating. The plasticizing agents prevent cracking.

Advantages claimed for Spraytex over paper board and felt applications include conformity and good bonding to surfaces regardless of contour, economical cost of application per square foot, and that it will not become loosened from the panel due to atmospheric conditions or road shocks.

Schrader Radiator Faucet

A MODERN water service device for filling automobile radiators has been added to the line of automotive accessories manufactured by A. Schrader's Sons, Division of the Scovill Mfg. Company, Brooklyn, New York. Termed the Schrader Radiator Faucet, this device facilitates the filling of radiators from a soft

even flow to a fast, non-splash stream. The faucet shuts off instantly, avoiding overflow and dripping on paint finishes. Its internal construction assures leak-proof performance. A stainless steel plunger and sturdy washer and packing keep this water service device in good working order.

Finishing Materials for Rubber

By L. J. Lamb
Sales Manager, Forbes Varnish Company

THE rubber industry has shown great ingenuity in adapting its products to many new and varied uses, with the result that rubber has taken on a multitude of new forms. A natural outgrowth has been an increasing demand for finishing materials for rubber.

The characteristics of such finishes vary greatly, depending upon requirements. Automobile tires, for example, are coated with black tire paint to insure uniformity and improvement in appearance. Ultimate durability is not, as a rule, important with a tire paint. Also, for the sake of appearance, tires are frequently decorated with trade mark insignia, or with stripings such as the familiar line around the side walls. Insignia decorations are usually made with colored lacquers, or with a bronze powder in a clear lacquer bronzing vehicle.

Automobile running boards receive a coat of black paint or enamel, especially designed for application to both rubber and metal, since the finish is applied after they have been assembled together. Such a finish not only produces uniform, attractive work, but is made to stand wear, exposure to weather, and rates high in salt spray tests.

Another type of rubber product used by the automotive industry is represented by motor mounts or supports, grommets, and the gaskets that are assembled at various places on the body to prevent squeaks and rattles as, for example, between the tail light and fender. These parts are coated with black lacquer, as a rule, but colored lacquers are sometimes employed. Finishes for this type of product must have good flexibility, and be resistant to water, oils, and gasoline.

Automobile steering wheels of the hard rubber type are finished with synthetic enamels, made with synthetic gums, because of their desirable characteristics of hardness, and long-wearing qualities. Steering wheels, especially of the softer rubber type, are also finished with lacquer, because of its greater flexibility.

The rubber moldings around the windows and windshields of automobiles are probably coated with lacquer. If the lacquer is a good one, properly constructed for the job, the moulding should look as bright and smooth as the finish on the car itself even after long exposure to the weather.

Requirements for Household Articles

It is interesting to note the different requirements that are required of a finish for household articles. The humble hot-water bottle, ordinarily made with colored rubber, is given a high gloss finish with clear lacquer that must, of course, be very flexible, and water-resistant. Some inexpensive garden hose is coated with colored lacquer of a type that has a high degree of flexibility, and resistance to weather exposure. Some of the more expensive grades that are made with colored rubber are coated with a very flexible clear lacquer for improving the gloss for appearance sake, and to give added durability. Articles like sink strainers, and the rubber molding or gasket that makes your refrigerator door air tight, are treated with lacquer rubber coatings that have good resistance to oils, mild acids and alkalis, rancid butter, and water.

The toy industry offers an excellent example of large users of rubber finishes. Some of the more inexpensive toys that are made with black or gray rubber, such as balls, dolls, small automobiles, etc., are coated with colored rubber cement, and the gloss is built up to toy brilliance by application of a coat of clear lacquer or varnish. Other toys are finished with a high gloss colored lacquer, or colored enamel. Certain toys that are made with colored rubber, are coated only with clear lacquer or clear varnish.

A Type for Every Finish

It will be noted that different types of finishes are chosen for different uses. For example, synthetic enamels for steering wheels, paint for tires, oil type enamels, and also pyroxylin base or lacquer enamels for toys, and bronzing lacquers for tires and decorating purposes.

Rubber finishes are simple to apply by brush, spray gun, or by dipping. Upon the kind of article to be finished, its size, shape and other factors, depends the best means of application. Most rubber finishes are designed to air-dry, but where time is an important factor, they may be force-dried on a very short schedule.

In analyzing the qualities required of a rubber finish, it is obvious that good adhesion to rubber is of paramount importance in every case. Finishes that are designed for use on other materials such as wood or metal, are not suitable, as a rule, for finishing rubber. The surfaces themselves are, in their very nature, entirely different. Also, whereas wood, metal and similar materials are rigid, rubber even in its harder forms is relatively pliable.

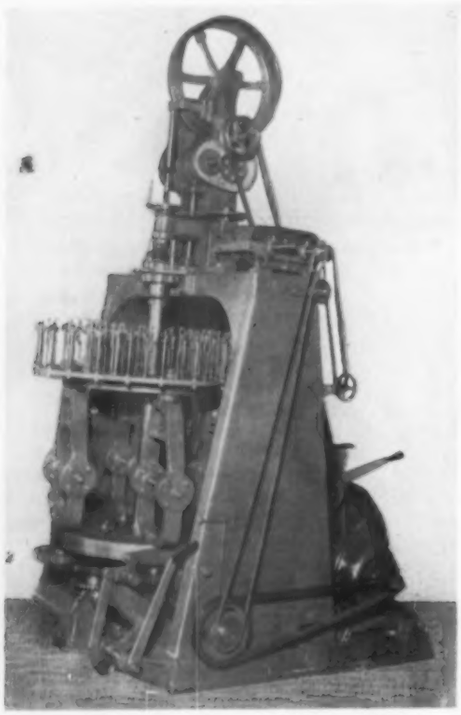
Beyond that, different products require special, and sometimes unusual requirements. Among the simple requirements are those of rubber finishes used for improving appearance, and for this purpose, finishes are available in colors in everything from black to the most brilliant of hues, with sheens from dead flat to a high, sharp gloss. From these relatively simple requirements we come to the more specialized finishes that require extraordinary flexibility, elasticity, resistance to oils, grease, mild acids and alkalis, rancid butter, water, etc., resistance to hard usage and wear, and to weather exposure.

There is a practicable finish for nearly every conceivable kind of rubber merchandise, but there is no one kind of rubber finish that will prove satisfactory on all rubber articles. To obtain the best finish for any given purpose it is highly desirable to give a clear-cut picture of what will be required to a competent manufacturer who has specialized in the production of finishes for rubber. Such manufacturers welcome an opportunity to enter new fields, and are glad to receive inquiries and co-operate in producing the proper finish in each case.

New Equipment

Variable Planetary Cabling Machine

BUILT to special order, a variable planetary type vertical cabling machine for use in the manufacture of rubber-covered flexible cord, has recently been completed by the New England Butt Company, of



Providence, Rhode Island. After forming the core of the cord the machine wraps a wind of cotton around it to act as a binder producing a smooth, round surface which is then rubber-covered. The motor, driven by a 7½ h.p. chain drive, is mounted on a base integral with the machine. Steel cradles support four 16-inch diameter by 9-inch traverse steel reels mounted in ball bearings. There is an arrangement of 52 fillers which consist of cotton wound on packages of 5-inch diameter by 7-inch traverse. A winding unit designed to carry a cop of yarn 5½-inch diameter by 2½-inch traverse, with storage capacity for extra cops, is directly above the die. This serving unit travels at a minimum speed of 1,285 r.p.m to a maximum of 5,150 r.p.m The capstan is of 24-inch diameter and is provided with gears for lays 5/16 to 5¾ inches. Provision is made directly behind the machine for winding up the conductor on a reel 30-inch diameter by 9-inch traverse. A new feature incorporated in the machine is a variable type of back turning device with provisions for varying the back turn of the individual conductors. Both the rotor and cotton serving unit are designed to run in either direction. Provisions are made at the capstan so that it will run in the correct direction regardless of the direction of either the rotor or cotton serving unit. The rotor revolves at a speed of 200 r.p.m. Weighing 5,545 pounds net, the cabling machine was constructed for a leading insulated wire manufacturer in the East.

Taylor "Thermospeed" System

TERMED the "Thermospeed," the Taylor Instrument Companies, Rochester, New York, have perfected an instrument which acts as a separable well tube system, separable wells being required on many temperature measurement and control applications to protect the temperature-sensitive bulb from corrosion or erosion. "Thermospeed" is said to have a speed response closely approaching fast bare bulb tube systems. Tests have indicated, according to the manufacturers, that the response due to this new construction is approximately six times faster than the average separable well tube system and almost twice as fast as separable well thermocouples.

New Farrel-Birmingham Press

DESIGNED especially for plastics and rubber molding operations, although adapted to other work, a new type of hydraulic press, with a self-contained hydraulic power unit using oil as the fluid medium, has been announced by the Farrel-Birmingham Company, Inc., of Ansonia, Conn. It is of 100 tons capacity and has platens 20-inch square, with 12-inch openings between platens. The variable displacement pump with its driving motor is mounted on a steel bedplate over the top crosshead, the crosshead also serving as an oil reservoir. Steam and oil pressure gauges are mounted in a white enameled depression on the front face of the top crosshead behind a shatter-proof glass and are illuminated by indirect lighting. The bottom crosshead is integral with the cylinder which contains the hardened ram. Interposed between the steam platens and the crossheads are ventilated grids to lessen heat transfer. Steam connections are provided for the upper and lower platens. Operation of the press requires the opening or closing of one

valve only, pressure adjustment requiring no further attention once it has been set for correct values. Although readily accessible for inspection and repair, all component parts that are not functional in the actual operation of the press are enclosed.

Book Reviews

A Rubber Plantation in New Jersey. Prepared and published by the Thiokol Corporation, Yardville, N. J.

The story of synthetic rubber is excellently told by this little booklet written in interesting style. The events leading up to the commercialization of Thiokol starting with the mixing of ethylene dichloride and sodium polysulfide by Dr. J. C. Patrick, now chief chemist of the Thiokol Corporation, are briefly outlined. Major differences in the chemical characteristics and properties of synthetic and crude rubber are discussed. The many uses to which synthetic rubbers have already been put, such as tubing, cables, fuel hose, printing plates, etc., are described with intimations of further uses. A series of clever black and white illustrations add to the attractiveness of the text. This booklet is recommended to all those in the rubber industry still unfamiliar with the background and potential applications of synthetic rubber —Thiokol in particular.

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Chlorinated Hydrocarbons. Issued by the R. & H. Chemicals Dept., E. I. du Pont de Nemours & Co., Inc., Wilmington, Delaware.

This technical bulletin lists the characteristics, properties, specifications and other useful information on chlorinated hydrocarbons, sixteen of which are included, all of them being in commercial use. These products are nonflammable and non-explosive, with the exception of a few which are moderately flammable. Some of these chlorinated hydrocarbons are liquid, others are gaseous at ordinary temperatures, while one is a solid. The bulletin provides information on flammability, classification, stability, effect on common engineering metals, selective solvent action, and commercial properties. Other data, necessary to the selection and use of these products for specific purposes, are also given.

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Ace Hard Rubber Protection (For Chemical Process Industries). Distributed by the American Hard Rubber Company, 11 Mercer Street, New York City. 64 pp.

The complete line of rubber linings featured by American Hard Rubber, including those for steel tanks, tank cars, pipes, pumps, utensils and other products, is described in this attractively put-together catalog. A list of solutions to which these linings offer corrosion resistance is given. Instructions for applying the linings in several instances are outlined. Dimensions are given of many Ace Hard Rubber pumps. Several utensils for acid handling, such as pails, dippers, beakers, bottles, etc., are described and illustrated. One section briefly describes the Anode Process. Weights of hard rubber rods, sheets and tubes are printed, as are the physical, chemical and electrical properties of hard rubber. The catalog is replete with information on hard rubber and its uses.

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Asiatic Production. Supplement to "The Truth About Restriction." By L. W. Holland. Published by Kelly & Walsh, Ltd., Raffles Place, Singapore, F.M.S.

Added to the author's book "The Truth About Restriction" after it had been published, this supplement treats with native, or Asiatic, production. It continues the author's demands for the inauguration of a six-day week on rubber plantations including those devoted to native or "Asiatic" production. Mr. Holland takes the stand that European producers are responsible for the seven day week and therefore should "adopt the six day week and reduce their own production first." As in the original booklet, the author repeats his theory that restriction is based "on figures only and not on any sound principle." Adoption of the six day week, in his opinion, will remove the "inequalities of restriction."

Economic Pitfalls in the Federal Social Security Act. By Allen W. Rucker, in collaboration with N. W. Pickering. Issued by Farrel-Birmingham Co., Inc., 19 Main Street, Ansonia, Conn.

The fourteenth in a series of booklet-editorials by the co-authors, this latest issue is devoted to a discussion of the new Federal Social Security Act. Terming the Act as either "an unfortunate blend of radical politics and reactionary economics, or a remarkably clever socialistic device for subverting economic freedom while maintaining the pretense of political liberty," the co-authors list a number of points created by it which are unfair to industry at large.

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Nineteenth Annual Report of the National Industrial Conference Board. Published by the Board, 247 Park Avenue, New York City. 75 pp.

This latest report covers the nature, purposes, and principles of the Conference Board, its organization, structure and support, its activities, services and publications, and similar data. Special attention is given to activities during the past year with a review included on the publications issued. The booklet contains a complete list of the officers, members (which includes six rubber manufacturers), councillors, correspondents, etc. A balance sheet as of April 30, 1935, is also reprinted.

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Foxboro Potentiometer Controllers. Bulletin No. 202. Issued by The Foxboro Company, Foxboro, Mass.

Of interest in this new catalog, which covers the complete Foxboro line of potentiometers and resistance thermometer controllers, is the description of a new Type H Drive Unit which is said to lower the investment costs of the Foxboro Potentiometer Controller. A number of simplified wiring diagrams for installation purposes are given. Instruments to handle practically all problems of industrial high temperature control are discussed in the catalog.

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The Hoeppler Viscosimeter. Distributed by the Fish-Schurman Corp., 230 East 45th Street, New York City.

Several models of the Hoeppler Viscosimeter, which operate on the "falling ball" method and measure viscosity in absolute units, are illustrated and described in this pamphlet. Such factors as the range of practicability, speed, economy and specifications of the viscosimeters are disussed. Miscellaneous measurements by P.T.R.A. with these models made on air, carbon dioxide, hydrogen, benzol, etc., at 20.00° C. are given. Of German make, Hoeppler Viscosimeters are merchandised in the United States by the Fish-Schurman Corp.

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Third Annual Report of the Commodity Exchange, Inc. Issued by the Commodity Exchange, Inc., 81 Broad Street, New York City.

This report, which covers the fiscal year from December 1, 1934, to November 30, 1935, contains a statement from the retiring president of the Exchange, Jerome Lewine, in which he briefly traces the history of the Exchange since its formation from the consolidation of several small exchanges, including The Rubber Exchange of New York. Included in the report is a balance sheet as of November 30, 1935, which shows total assets of $1,034,542.

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Bulk Material Handling Machinery. (Section 106 of General Catalog 100.) Distributed by Palmer-Bee Company, Detroit, Mich. 288 pp.

The complete line of elevating, conveying and power transmitting machinery manufactured by Palmer-Bee is described and illustrated in this catalog, one of the most complete of its kind. It is replete with specifications, charts, dimensions and illustrations of the widely varied line produced. The catalog also contains a list of engineering constants, electrical data, power formulas, and tables devoted to weights of various materials.

Editorial Comment

Continued Improvement

PRACTICALLY every survey of the rubber industry as a whole, made in the last year or two, has resulted in a favorable report. The latest of these surveys, embracing the entire rubber goods industry, from tire manufacturing to wholesaling activities, conducted by Dun and Bradstreet, Inc., reveals the satisfying fact that both production and distribution divisions of the industry closed the year 1935 with sizeable gains over the preceding year.

For instance: tire production increased by 4% over 1934; the production of sundries, surgical and druggists' supplies, and household goods increased by 5 to 10%; while output of mechanical rubber goods showed gains in every comparative month. Naturally, the effect of these combined gains was a respectable increase in rubber consumption, with every month from June through December exceeding the same month of the previous year. An encouraging note for the current year is found in trade estimates which set crude consumption in the United States at approximately 550,000 long tons.

Another indication of improvement is seen in the fact that a new low was set in 1935 on the number of bankruptcies in the rubber goods industry. The combined bankruptcies of rubber manufacturers, wholesalers and retailers amounted to only 5 in all, as contrasted with 7 in the previous year.

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Goodyear Program

MUCH too little importance has been attached to the 1936 program of the Goodyear Tire and Rubber Company outlined by President Paul W. Litchfield, details of which were carried in our last issue. Briefly, Mr. Litchfield stated that positive stability of price will be maintained in 1936 to all classes of Goodyear customers; operations will be conducted on a profit basis; prices will not be sacrificed for volume production; special warranties will be eliminated. This is the first time in a decade that any member of the "Big Four" has definitely gone on record with a program of so far-sounding effects.

True, only Goodyear has made public a statement of this import; but tire history tells us that what one of the larger manufacturers does, or attempts to do, is adhered to by the other large manufacturers and is followed, insofar as possible, by the smaller tire makers. If Goodyear sticks to this program, especially where price stability and non-sacrifice of price to production volume is concerned, there is every indication that the disastrous price wars of former years, to which tire managements attribute lack of annual profits, will be kept to a minimum if not entirely eliminated.

Of particular significance in the Goodyear declaration is the statement referring to "production volume." One of the prime reasons for the start of price wars, second only to the action of chain service stations, is the far-flung desire for mass production with prices brought down to the very rim of profit possibilities, often falling below any thoughts of profit. Goodyear, particularly, depends upon mass production methods to sell quantity tires, especially to Sears, Roebuck and Company. Therefore, when Goodyear promises not to "sacrifice price to increase volume production" the statement is all the more significant.

There is another favorable angle which seems to assure the elimination of price wars, as pointed out by President O'Neil, of General Tire and Rubber, viz: during 1935 automobile manufacturers paid more for original equipment tires than dealers did for replacements, this situation applying for the first time in a decade. Profits made on original equipment tires were used to "fight in the dealer field," according to Mr. O'Neil. But the 10% profit margin on original equipment tires has been withdrawn, prices are lower at Detroit and costs are up in Akron, therefore prices in the dealer field will probably be far more stable.

Tire manufacturers, as far as can be learned, are enforcing the terms of the price agreement entered into on November 1, 1935, calling for a general reduction of discounts; profits (or the lack of them) from original equipment sales cannot be used to "fight" in the dealer field; Goodyear has gone on record with regard to price stability—all of these factors lend themselves to the strong possibility that the current year will be marked by an absence of price wars. It remains to be seen.

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Strange Tactics

AKRON was the scene of some strange proceedings in recent weeks when, in a ten day period, departmental workers in the Firestone, Goodyear and Goodrich plants staged "sit down" protests against fancied grievances. The new method of protest is apparently labor's latest method to secure the attention of the managements.

Although rubber union leaders claim the outcomes indicate how they can settle controversies by "peaceful means" they also indicate how quickly "sit down" protests or strikes can be started in the large factories, as in the Firestone case, trivialities. Perhaps these quickly settled "sit downs" should be welcomed at this time by the rubber manufacturers. It teaches them what may be expected in the future—and how to handle it.

CURRENT • NEWS
of the Rubber Industry

FEBRUARY, 1936

RUBBER ABSORPTION SETS RECORD IN 1935

43,927 More Tons than 1934 Used by American Factories and 29,750 More Tons Than in the Peak Year of 1929; Levels Continuing.

A new all-time high in rubber consumption by manufacturers in the United States was set for the twelve months of 1935, according to statistics compiled by the Rubber Manufacturers' Association. The amount consumed was approximately 497,150 long tons, which compares with 453,223 long tons consumed during the previous year, and 401,000 long tons in 1933. A total of 43,927 more long tons was consumed in 1935 than in 1934, and 29,750 more tons than the amount consumed in 1929, the previous peak year, when 467,400 long tons were reported.

A continuation of this high level of consumption is expected by American interests, many authorities setting the consumption figure for the first quarter of 1936 at 135,000 tons, approximately the amount consumed in the first quarter of 1935. Although consumption figures for the rest of the world are not yet available, preliminary statistics indicate that world consumption will fall short of the predicted one million tons, especially in view of the fact that world absorption, outside of the United States, for the first ten months of 1935, was slightly lower than in the same period of 1934.

Imports of crude rubber for the year 1935 were reported to be 448,116 long tons, some 20,000 tons less than the 469,484 long tons imported during the previous year, and approximately 36,000 more than the 411,615 long tons imported in 1933.

Consumption of reclaimed rubber for 1935 is estimated by the Association to be 112,712 long tons as compared with 100,855 long tons for 1934 and 85,000 long tons used in 1933. Reclaimers predict a still larger increase in 1936 based upon generally improved business conditions and a healthy demand.

Production of reclaimed rubber for 1935 is estimated to be 122,948 long tons, approximately 15,000 more tons than the 107,766 long tons produced in 1934, and approximately 33,000 tons more than the 90,026 long tons produced in 1933. In anticipation of increased demand, production exceeded consumption in December, 1935.

The action of the International Rubber Regulation Committee in severely restricting shipments during the latter half of 1935, despite the quota increase granted to the Netherlands East Indies, resulted in a steady decline in world stocks of crude rubber during the last few months of the year. At the end of 1935 these world stocks amounted to approximately 650,000 tons, the lowest total since early in 1934. This steady reduction in world stocks has been an important factor in the rising price of crude rubber on the Commodity Exchange and in the outside market.

Seek Solid Tire Ban

The Noise Abatement Committee of the First Avenue Association, of New York City, sent a recommendation to the Mayor recently to the effect that all solid rubber tired vehicles should be barred from use in the city on the basis that they are "noise producers." The Committee, headed by Clyde R. Place, stated that a ban of this nature would be of considerable aid in reducing day and night noises in the city, to which purpose Mayor LaGuardia has pledged his administration.

Close Hudson (Mass.) Plant

As expected, the United States Rubber Products Company has officially closed the footwear factory at Hudson, Massachusetts, which it recently purchased from the Firestone Footwear Company. Under normal operation the factory employed 800 persons and constituted the town's principal industry. It had been in operation for 35 consecutive years. According to U. S. officials, all possible operators will be transferred to the footwear factory operated by the company at Naugatuck, Connecticut. Although the announcement stated that the Hudson plant was being "shut down for an indefinite period" the machinery and fixtures will probably be removed at a later date according to report.

DECISION AWAITED IN GOODYEAR SUIT

Final Oral Arguments Presented on January 15 Before the FTC Sum Up Testimony Gathered in Two Years on Goodyear-Sears Contract

A decision by the Federal Trade Commission on the question as to whether the contract between the Goodyear Tire & Rubber Company and Sears, Roebuck and Company constitutes a violation of the anti-trust laws by "unfair price discrimination" is momentarily expected. Final oral arguments in the two-year case, instituted against Goodyear by the Commission, were heard at Washington on January 15.

The arguments ended on a note of bitterness between the opposing attorneys, Goodyear attorneys stressing the point that the contract with Sears-Roebuck was a matter of "good business" and not a violation of the anti-trust laws, with FTC attorneys claiming that the contract was responsible for many of the price-cutting evils prevalent in the tire industry. They further alleged that because of this contract other tire manufacturers attempted to meet Goodyear's mass production methods which led to other price leaders distributed by the service stations.

Goodyear attorneys spent considerable of their apportioned time in arguing the fact that if Sears had been charged with its proportionate share of advertising, selling and administrative costs the gross profit of $9,503,929 realized from the $116,000,000 received from Sears in seven years would have been wiped out and a loss sustained. FTC attorneys have claimed that Sears derived due benefit from Goodyear advertising "because it was common knowledge that Goodyear was making Sears tires." Goodyear attorneys, however, contend that Sears could not possibly have benefited from Goodyear advertising since the tires sold by the mail order house bore no evidence of having been made by Goodyear.

In his summation, Grover Higgins, Goodyear counsel, again attacked the Commission's charge that a "secret" bonus of $1,250,000 had been paid to Sears in common stock for a 10-year purchase contract starting in 1931. He claimed there was nothing clandestine

about the agreement which was drawn up in his own office, a portion of it later being made public property, but the part devoted to Goodyear's production cost remaining the company's property.

E. F. Haycraft, Commission attorney, stated that from its "own figures, its own chart and its own table" Goodyear showed a minimum discrimination of 26.15% on aggregate sales to Sears. Goodyear admits to a discrimination, but one of 7% only, that amount being within the confines permitted by the Clayton Acts.

He further contended that if allocation of "proper costs" were made in the Goodyear-Sears contract the tire company would have sustained a net loss of "more than $14,000,000 on its business with Sears" whereas Goodyear claims a profit of approximately nine millions. In his final summation, Mr. Haycraft charged Goodyear with bringing "chaos" to the tire industry because of its contract with Sears, with "bad faith" in surrounding the contract with "secrecy," and asked the FTC to take away from Sears its "discriminatory tire price weapon."

Final oral arguments were heard by the following FTC Commissioners: Chairman Charles H. March, Robert E. Freer, G. H. Ferguson and Judge E. L. Davis. Included among the spectators at the proceedings were Harvey S. Firestone, Sr., John W. Thomas, president of Firestone, and B. M. Robinson, chief counsel for Firestone. The former has frequently been accused of being the background in the action against the Goodyear-Sears contract and has been openly charged by Goodyear attorneys with leading a counter-attack to mail order chains and stores.

NOVEMBER SHIPMENTS 2.6% BELOW OCTOBER

Shipments of pneumatic casings during the month of November, 1935, are estimated to be 3,989,877 units, a decrease of 2.6% below October, 1935, but were 25% over shipments made in November, 1934, according to statistics released by the Rubber Manufacturers Association.

Production of pneumatic casings for November is estimated to be 3,997,025 casings, a decrease of 1.3% under October, 1935, although 19.6% above November, 1934.

Pneumatic casings in the hands of manufacturers, November 30th, are estimated to be 8,249,220, practically no change as compared with stocks on hand October 30th, 1935, although 6% below stocks on hand November 30, 1934.

The actual figures are as follows:

PNEUMATIC CASINGS

	Shipments	*Production*	*Inventory*
Nov., 1935	3,989,877	3,997,025	8,249,220
Oct., 1935	4,095,488	4,050,509	8,290,594
Nov., 1934	3,191,102	3,340,859	8,778,989

BOAT SHOW INDICATES MORE USES OF RUBBER

Increased use of rubber parts and applications in the marine industry was indicated by many of the attractive exhibits which featured the 31st Annual National Motor Boat Show held in New York City from January 17 to 25 at the Grand Central Palace under the sponsorship of the National Association of Engine and Boat Manufacturers. The products of several rubber manufacturers intended for use in this field were also on display.

Rubber mountings of both marine and outboard types of motors is becoming more popular. Rubber mounted marine engines were displayed in the booths of the Amplex Division of the Chrysler Corp., and the Gray Marine Motor Co. Evinrude models of the Outboard Motors Corp., Sea Horse models of the Johnson Motor Co., and Eclipse models of the newly-organized Bendix Marine Products Co.—all of the outboard type—were among those stressing rubber mounting advantages. Some of the Evinrude models also feature rubber mounted steering handles, rubber-cushioned weedless types of propeller, and a rubber-mounted co-pilot, a device for self-steering. All control in the Eclipse outboards is centered in the steering head which consists of a rubber-cushioned tiller and 3-position switch.

Among the various boat models using rubber-cushioned motors of the marine type were those made by the Chris-Craft Corp., Gar Wood, Inc., the Elco Works, and the Richardson Boat Company.

The complete line of Goodrich Cutless Bearings was exhibited in the booth of Lucian Q. Moffitt, Inc., of Akron, national distributors in the marine field. These bearings are used as standard equipment in many boats, and are offered as optional equipment in several others. A new type of rubber rolling bearing was displayed by the Columbian Bronze Corporation which incorporates the advantages of rubber with roller bearing principles. Known as the Columbian Frictionless Rubber Rolling Bearings, these bearings are installed in pleasure and commercial craft with the rubber rolls under slight compression so the rubber will automatically be maintained in good condition. The composition of the rubber is said to be such that it will roll over sand or grit. Although water acts as a lubricant for the bearings, they may be run dry for several hours if desired. Used mostly in stern bearings and struts, the new type bearing's prime advantage is its rolling action which prevents wear and tear on the propeller shaft or the bearing housing.

A number of rubber accessories were displayed by the American Pad and Textile Company under the "Airubber" brand name. These included inflatable pak-boats, life preservers, pads, pillows, cushions, mattresses, etc. The pak-boats, which are made from woven fabric coated on the inside with a 1/16th inch thickness of latex calendered to the fabric, the bottom being of rubberized duck, attracted particular attention in this booth. The boats are said to be the only kind of inflating models made with pontoons sealed by pressure molding. These models also include inflating seats.

Pads, cushions and pillows upholstered with Hairflex, a latex-impregnated curled hair material, were on display in the E. J. Willis Company booth. The advantages of this upholstering—resiliency, light weight, vermin-proof, longevity and adaptability—were stressed by booth attendants to interested parties. Samples of sponge rubber suitable for the manufacture of a variety of marine accessories, produced by Rubatex Products, Inc., were also displayed in the Willis exhibit, as well as a number of other parts and accessories. Leather cushions fitted with inside inflatable rubber pads were displayed by the Atlantic-Pacific Mfg. Corporation.

Of particular interest at the exhibition was the unique testing machine included in the Goodrich cutless bearing exhibit in the Moffitt booth. Consisting of a tank filled with sandy water in which a shaft was operated by an electric motor, visitors were able to observe the actual effects of sand and grit on bearings and shafts. The shaft was carried in three different type bearings, one of which was of Goodrich make, each bearing having a cut-away section so that condition of both shaft and bearing could be seen. Agitators prevented the sand from settling at the bottom of the tank. The demonstration pointed out how the rubber surface of Goodrich bearings prevents scoring of the shaft by sand and other foreign materials indigenous to sea water.

SCHEDULE TWO PAPERS FOR BOSTON MEETING

Two technical papers are scheduled for the next meeting of the Boston Group, Rubber Division, A.C.S., which will be held on Tuesday evening, February 18, at the University Club, 40 Trinity Place, Boston. The usual dinner will be served at 6:30 P.M.

Dr. J. C. Patrick, director of research, Thiokol Corporation, Yardville, N. J., will deliver a paper on "Rubber-Like Sulfur Polymers," while G. E. Long and I. S. Black, of the U. S. Rubber Company, have prepared an address on the "Manufacture of Golf Balls." The latter paper will be illustrated by motion pictures.

Tickets for the meeting are $1.50 to members of the Boston Rubber Group, and $1.75 to non-members. Dr. Royce J. Noble, 56 Wilbur Street, Malden, Mass., is secretary-treasurer of the group.

NATIONAL MACHINERY FILES PATENT ACTION

An action was brought on January 21 in the Common Pleas Court of Summit County (Ohio) by the National Rubber Machinery Company against Paul A. Frank, both of Akron, for the purpose of obtaining a declaratory judgment whereby the respective rights of both parties involved may be determined.

The action was a repercussion of the recent decision handed down by the Sixth Circuit Court of Appeals, at Cincinnati, in the U. S. Rubber versus Firestone patent controversy on the flat band method of tire building in which the defendant (Firestone) won a "substantial victory" when the judges decided that there was no infringement involved on six of the seven patents on which the original suit was based.

According to L. W. Buckingham, National Rubber attorney, Paul A. Frank, several years ago, as licensee under certain patents owned by U. S. Rubber pertaining to tire building machines of the drum type, entered into a contract with National by which it was agreed that the latter should manufacture all machinery of that type which was sold in the United States. Mr. Frank was to receive a commission of 10% of the sale price on all such machinery sold even though he was not in any manner concerned with such sales. Although other machinery and equipment has been developed to be used in connection with tire building, Mr. Frank has claimed and received a 10% commission on all such equipment manufactured and sold by National.

Since the court's decision in the U. S. Rubber versus Firestone suit stating that certain of the patent rights allegedly controlled by U. S. were invalid, and since these patent rights were part of the subject matter of the contract between Mr. Frank and National Machinery, the current action was brought to obtain a declaratory judgment without disturbing the contract relationship between Mr. Frank and the machinery company.

Filed by Attorney Joseph Thomas for the plaintiff, the suit specifically asks the court to declare the firm's contract with Mr. Frank valid but to rule that it need pay him commissions only on the processes on which valid, unexpired patents exist. Messrs. Thomas and Buckingham are members of the law firm of Rockwell, Grant, Doolittle, Thomas and Buckingham, located in the Second National Building, in Akron.

Release Skinner Tax Lien

T. J. Conner, of Cincinnati, collector of internal revenue, released a $35,092 excise tax lien against property of the Skinner Tire & Rubber Company, Dayton, Ohio, on January 14. U. S. District Judge Robert R. Nevin recently ruled that the tax was not properly assessed against Skinner on May 27, 1933.

NEW OFFICERS OF NEW YORK RUBBER GROUP

R. D. Gartrell

Dr. J. Miscall

Above are shown the new chairman and vice-chairman of the New York Group, Rubber Division, A.C.S., elected at the meeting held at the Building Trades Club in New York City on December 20. R. D. Gartrell is Development Manager of the Mechanical Goods Department, U. S. Rubber Products, Inc., at Passaic, N. J. Born in 1895, he was graduated by Georgia Tech in 1916 and was employed by the Milton, Hersey Co., Ltd., consulting chemists of Montreal, Canada, in the same year. In 1917 he joined the Dominion Rubber Company, Ltd., also of Montreal, as research chemist, and occupied various technical posts with that company until 1931 in which year he became assistant director of development at the General Laboratories of U. S. Rubber at Passaic, later advancing to the post of development manager. Dr. J. Miscall, the new vice-chairman, who acted as chairman of the Picnic Committee for the outing of the New York Rubber Group last Summer, is director of research and development for the Flintkote Company, East Rutherford, N. J. Dr. Miscall is well known in the industry for his technical achievements and contributions to the technical journals.

ELECT NEW OFFICERS OF CALIFORNIA GROUP

Charles N. Merralls, president of the Rubbercraft Corporation of California, Ltd., was re-elected president of the California Rubber Manufacturers' Association for the seventh consecutive time at the first monthly supper meeting of the Winter Season held by the Association on January 15 at the Jonathan Club in Los Angeles.

Officers besides Mr. Merralls were elected as follows: T. Kirk Hill (Kirkhill Rubber), vice-president; John Ballagh (Patterson-Ballagh Corp.), secretary; and Douglas Radford (West American Rubber) and Albert Rochlen (Golden State Rubber Mills), directors.

Edwin B. Cassidy, of Lybrand, Ross Brothers and Montgomery, of Los Angeles, national accountants, was the guest speaker of the evening. He delivered an address explaining the laws relating to both Federal and state social security legislation and the resulting taxes. Following this address, the members engaged in a discussion on the legislation outlined and agreed that business in general would have a healthier growth if tax measures could be repealed or revised to simplify bookkeeping methods.

Mr. Merralls then delivered a brief address outlining methods by which harmonious action among and between members of the Association could be accomplished. Mr. T. Kirk Hill announced the completion of a new warehouse adjacent to his plant. Several other manufacturers reported the installation of new equipment based upon improved business.

During the remainder of the Winter and the Spring it was decided to hold the monthly meetings on the third Thursday of each month. In order to increase attendance, each member present was asked to bring with him at least one guest to future meetings, either a member of his organization or an interested executive. Programs to interest such guests will be inaugurated.

Plan Packaging Exposition

A four-day session of conferences, clinics and round table meetings is planned in connection with the Sixth Packaging Exposition, sponsored by the American Management Association, which will be held from March 3 to 6 inclusive at the Pennsylvania Hotel, in New York City. Several of the scheduled papers cover items of specific interest to executives of the rubber industry while problems pertinent to the industry may be presented at any of the "clinics." S. T. Edgerton, U. S. Rubber purchasing agent, is scheduled to deliver an address on "The Purchasing Agent Selects Shipping Containers" on Thursday morning, March 5, in the Salle Moderne (Roof) of the Pennsylvania Hotel.

LOS ANGELES GROUP HOLDS TWO MEETINGS

Some of the 96 members and guests at the February 4th meeting of the L. A. Rubber Group.

January 16th Meeting

At its regular monthly supper meeting, held on January 16, in the dining room of the Furniture Mart, 2155 East 7th Street, the Los Angeles Group of the Rubber Division, A. C. S. outlined as far as possible its program for the balance of the year. Attended by 63 members, the meeting was one of the largest held in several years by the group. Several standing committees for the year were appointed as follows:

Entertainment Committee—Ed Royal (H. M. Royal), chairman; Carl E. Stentz (E. M. Smith Rubber); and Arthur Wolfe (N. J. Zinc Company). *Membership Committee*—Phil Drew (Goodyear of California), chairman; R. E. Hutchinson (Firestone of California); W. R. Hucks (Goodrich); William Reeder (U. S. Rubber); B. E. Dougherty (Dougherty Company); and R. D. Abbott (C. P. Hall). *Golf Committee*—Howard H. Hummer (Xylos Rubber), chairman; and M. Montgomery (Martin, Hoyt and Milne Company).

For the purpose of increasing regular attendance it was decided to hold the monthly indoor meetings, which feature a supper, on the first Tuesday of the month from September through April. Outdoor events will feature the four remaining Summer months. In the past the Los Angeles Group held spontaneous meetings whenever guest speakers were in the vicinity.

With George Balazs, of Goodyear, presiding in his position of newly-elected chairman, the entertainment for the evening consisted of a lecture and motion pictures on the Metropolitan Water District project. The lecturer, M. W. Hawks, Los Angeles industrial engineer associated with the project, pointed out that completion of the undertaking would bring water and power from Boulder Dam to Southern California with indirect benefits to the local rubber industry by means of greater growth in the affected area. The water project will cost $220,000,000 and is due for completion in four more years.

Following the presentation of these motion pictures illustrating the progress being made on the water project, T. Kirk Hill, president of the Kirkhill Rubber Company, presented a 10-minute talk on the development of his company.

Several methods for boosting attendance at regular meetings are being inaugurated by the group. One of these methods calls for membership buttons on which both the member's name and company connection would appear. Funds for this purpose were appropriated. Another method inaugurated with this meeting was the granting of door prizes in which all members presenting their reservations at least two days before the meeting are permitted to participate, lucky numbers being drawn to select winners. At the meeting W. J. Haney (Kirkhill Rubber) was awarded a zipper-type bag, Ed Royal (H. M. Royal) a sponge rubber auto mat, and Carl Dunkel (Pacific R. and H. Company) a chair cushion. The three prizes were donated by three separate companies.

It was also decided at the meeting to inject more personality features during the coming year and with this view in mind Charles Lamb (West American Rubber) was dubbed the "Rubberized Hollywood Walter Winchell" with the requirement that he make "personality reports" at each meeting. Carl E. Stentz (E. M. Smith) was named publicity representative.

A questionnaire has also been prepared and is being sent to all members of the group with a view toward getting a comprehensive personality sketch of each one.

An active golf season, with probable prizes, is being planned for the near future but as yet no definite dates or events have been scheduled.

February 4th Meeting

"Camel Back" was the general topic discussed at the February 4th meeting of the Los Angeles Group, Rubber Division, A.C.S., held at the Furniture Mart cafe, in Los Angeles. Tire repair also came in for a share of attention from various angles including sales competition and mechanical means. The meeting was presided over by Ed Royal in the absence of Chairman G. G. Balazs who recently underwent an appendectomy.

Among those addressing the meeting, at which 96 members and guests were present, a record number, were E. J. Weinheimer, general manager, Western Dri-Kure Vulcanizer Mfg. Company, who spoke on quality merchandise and urged patronage of manufacturers of standard equipment at profit-making prices; Dick Richards, Los Angeles manager, Oliver Tire and Rubber Company, who gave a brief resume of the history of his company mentioning a growth of 1,000% in output and capacity since 1929; F. W. Beck, head of the National Equipment Sales Company, who gave a demonstration of the use of the tire slotter and discussed re-grooving of tires; and J. W. Hetzer, Los Angeles manager, Keaton Tire & Rubber Company, on the Keaton Thread Cutter comparing its value with those of another day.

Short talks were also delivered by L. R. Keltner, heat engineer for B. F. Goodrich, and R. A. Buckby, General Electric engineer, the latter speaking on "The Science of Seeing" and demonstrating many of his points.

Following the recently inaugurated custom three door prizes were awarded to the first three members presenting applications for tickets to the meeting. It was announced that prizes for the March meeting will be donated by Francis S. Pratt, manager, Pacific Division, R. and H. Chemical Department, of E. I. du Pont de Nemours & Company.

CRUDE CONSUMPTION RISES IN DECEMBER

Consumption of crude rubber by manufacturers in the United States for the month of December, 1935, is estimated to be 42,942 long tons (an all-time high for this month), and compares with 42,778 long tons for November, 1935, and 36,569 long tons for December, 1934, according to statistics furnished by the Rubber Manufacturers' Association.

Imports of crude rubber for December were reported to be 34,596 long tons as compared with 28,826 long tons for November and 29,200 long tons for December, 1934.

Total domestic stocks of crude rubber on hand December 31, 1935, were estimated to be 295,438 long tons, which compares with 303,162 long tons on hand November 30 and 355,000 long tons on hand December 31, 1934.

Crude rubber afloat to United States ports as of December 31 is estimated to be 39,094 long tons as compared with 46,588 long tons afloat on November 30 and 47,644 long tons afloat on December 31, 1934.

December reclaimed rubber consumption is estimated to be 8,521 long tons; production, 12,307 long tons; and stocks on hand, December 31, 25,069 long tons.

USES OF THIOKOL DESCRIBED AT LUNCHEON

At a luncheon of over 100 engineers, chemists, industrial executives and editors, held at the Biltmore Hotel in New York City on January 27th, the rapid progress being made in the use of Thiokol in various industries was described not only by members of the Thiokol Corporation but also by several users of the synthetic rubber. Many present were given an insight for the first time into the story behind the development of Thiokol and the diversified uses to which it has already been put.

As an indication of the ease with which this synthetic rubber can be manufactured, each guest actually made a sample at his table in accordance with instructions given by Dr. J. C. Patrick, inventor of Thiokol, and Chief of Research of the Thiokol Corporation. Into a glass container containing a solution of polysulfide and ethylene dichloride was poured a dilute solution of hydrochloric acid, which after stirring caused a mass to settle out, which when squeezed dry was a sample of Thiokol.

Bevis Longstreth, president of the company, told of the development of Thiokol and its many present-day uses. "The magic of rubber is in compounding and the art of compounding had to be worked out for synthetic rubber as evidenced by the increase in tensile in Thiokol to 2000 pounds from 200 pounds a few years ago," stated Mr. Longstreth. He pointed out that different types of Thiokol have been developed to meet and even anticipate requirements of users. Viewed as a source of rubber supply in times of war, Mr. Longstreth stressed the fact that all the ingredients are produced in this country and are practically inexhaustible.

"The price of synthetic rubber is higher than natural rubber," the speaker said, "but Thiokol does things which crude rubber will not do. It replaces rubber, as well as other materials such as metals, cork, felt, etc., and by construction changes in some articles, such as ignition cables, it can compete with rubber. Synthetic rubber has the opportunity of reducing the cost of manufacture by decreasing processing costs. The new Thiokol in powder form, for instance, is vulcanized and compounded and can be formed into finished products in three minutes. Therefore, even if synthetic rubber can never be produced at the price of natural rubber it is probable that it can be made in such a way as to eliminate many of the usual factory processes."

Professor C. Emmett Reid, head of the Organic Chemistry Department of Johns Hopkins University, spoke on the importance of sulfur to mankind citing its use in the manufacture of sulfuric acid, in medicine, in artificial silk, in vulcanization and in numerous other applications. He stated that Thiokol was an outstanding development in sulfur chemistry and gave credit to Dr. Patrick for his work in producing synthetic rubber from such an "unpromising material."

Dr. Patrick described how in his attempts to create an anti-freeze liquid in the early 20's, he poured two chemicals together and got a gummy mass that looked and acted like rubber. From that start the material has been improved so that today it has the properties of being insoluble in gasoline, oils, dilute acids and alkalis—all of which affect rubber. Oxygen and ozone will not affect it, nor does it become soft or brittle at high or low temperatures, said Dr. Patrick.

The use of printing plates made of Thiokol was described by J. E. Frey, manager of the Printing Division of Standard Register Company, Dayton, Ohio. He stated that such plates printed like offset, used less ink, were easy to handle, were made in a few minutes, could be reground and used over again, saved machinery and were cheaper and more durable than metal plates.

The next speaker, Mr. C. Kenyon, president, Vulcan Proofing Company, Brooklyn, N. Y., told how his company succeeded in producing offset blankets made from Thiokol which are used throughout the magazine and newspaper field of today. Such blankets are strong, have great resiliency and in addition resist oxidization and the action of oils and inks. He also mentioned the use of Thiokol as a coating for fabrics used in gas masks, airships, etc.

Mr. Donald Simmons, Chief of Research of General Cable Company, explained that in the manufacture of some of their cables, Thiokol, used as a sheath to replace lead, was found to make them proof against ozone, acids, alkalis, oil, gasoline and sun exposure.

The last speaker was Sidney Kirkpatrick, Editor of *Chemical and Metallurgical Engineering*, who briefly reviewed the progress of industrial chemistry and paid tribute to those companies who have pioneered in new fields including that of synthetic rubber.

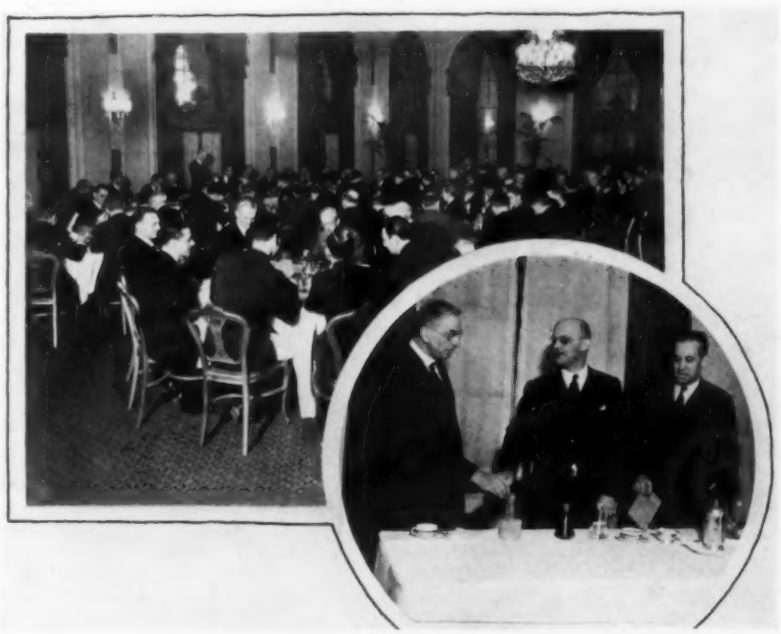
An attractive booklet, "A Rubber Plantation in New Jersey," giving an interesting account of Thiokol was distributed to all present. (This booklet is described on the Book Review page of this issue.—EDITOR).

RHODE ISLAND CLUB SETS MEETING DATE

The next meeting of the Rhode Island Rubber Club will be held on Thursday evening, March 12, at the Narragansett Hotel, in Providence. Dinner is scheduled for 6:30 sharp.

Two speakers will address the attendance, the first of which will be John M. Bierer, factory manager, Boston Woven Hose and Rubber Company, Cambridge, Mass., on "Experiences in the Rubber Industry During the Past 25 Years." Well known in the industry for both his technical achievements and his oratorical ability, Mr. Bierer's address should be most interesting.

Alton Hall Blackington, internationally-known news photographer and lecturer, of Boston, will be the second speaker of the evening. Mr. Blackington will illustrate his lecture "Romance of News-Gathering" with slides and motion pictures and should provide decidedly novel entertainment.



Diners at the Thiokol luncheon seen making synthetic rubber. In the inset are (left to right) Dr. Emmett Reid, of Johns Hopkins; Dr. J. C. Patrick, inventor and research director of Thiokol; and Dr. Craig Dougherty, of Princeton University.

Financial News

U. S. MAY SOON RECALL 5% MORTGAGE BONDS

According to reports accepted as authentic in well informed financial circles, the United States Rubber Company may shortly recall its first and refunding mortgage bonds, 5% gold, Series A, of 1947. Stockholders of the company will probably be asked to vote on such a proposal at the next annual meeting scheduled for April 21.

Originally, U. S. Rubber issued $69,000,000 of the 5s of 1947. To date $16,000,000 of the bonds have been retired or redeemed while another $2,000,000 are held in the Treasury, leaving a total of $51,000,000 still outstanding. The indenture under which the securities were issued is understood to have led to complicated restrictions with the result that U. S. desires to straighten out its position.

Among such restrictions is one which does not permit the company to consolidate its subsidiaries if desired in order to lessen its tax impositions. The indenture also contains no provision for calling the bonds for sinking fund payments.

Although it is possible that the directors may have in mind the issuance of another series of mortgage bonds falling due in 1947 at a lower rate of interest than that which now applies, financial circles believe the move is actually planned to remove some of the imposed restrictions rather than a lower coupon rate.

GENERAL TIRE SHOWS NET LOSS OF $115,756

For the year ended November 30, 1935, General Tire & Rubber Company, Akron, shows a net loss of $115,756 as compared with a net profit of $679,199 in the preceding year. In a statement accompanying the report, William O'Neil, president, blames the reversal in profits on the price wars conducted during the period covered by the report.

Gross sales amounted to $15,501,999, with discounts, returns and allowances all deducted. Prior to depreciation, a gross profit of $4,298,331 was realized. Prior to the deduction of allowances covering depreciation, interest on borrowed money and miscellaneous charges, a profit of $157,941 is shown by the report. These allowances amounted to $273,697 resulting in the net loss for the period transferred to surplus. The rates of depreciation on certain capital assets were reduced during the year to conform to rates allowable for Federal income tax purposes.

The balance sheet at the close of the period reveals cash assets of $663,167 and total current assets of $7,447,185 as compared with total current liabilities of $1,905,713. Notes payable to banks amount to $900,000. No allowance has been made in the report for the possible recovery of processing taxes nor to money placed in escrow with the Federal Court by a a fabric mill in which General has a controlling interest. The money held in escrow has since been ordered refunded to the company.

According to Mr. O'Neil a peculiar situation prevailed in the tire business during 1935. "For ten years," he reported, "there has been no profit in the original equipment business. During the price wars of 1935 automobile manufacturers paid a higher price for tires than did tire dealers. This was particularly true of truck tires. With a profit in the original equipment field the original equipment suppliers had funds to fight in the dealer field. This was the first time that this had happened in many years. Prices are now lower at Detroit and costs are higher, so we believe prices in the dealer field will be more stable."

Canadian operations of General Tire, according to the report, showed a loss, but the company's investment in Mexico is proving satisfactory and profitable. The Mexican sales are not included in the sales total shown. Export business also increased. Gross sales for the period were approximately one million dollars higher than 1934.

Delay Goodrich Offering

Any action to place B. F. Goodrich Company refinancing bonds, $28,000,000 of which is planned for the initial issue, will be deferred until the New York courts act on the Goodrich petition to put a stamp of validity on the offering, according to Goodrich officials, although no official statement has been issued. Rumor had it that the bonds would be offered late last month, a compromise agreement having been reported by which Otis and Company would market the bonds jointly with the Goldman-Sachs Company. Decision on the Goodrich petition is expected sometime this month.

Goodyear Rubber Dividend

A dividend of $2.50 a share on the preferred stock has been announced by the Goodyear Rubber Company, of Middletown, Connecticut, payable to stockholders of record on January 22. This is the first payment of a dividend since the company was organized six years ago when it took over the factory and business of an older company of the same name.

BALDWIN RUBBER MAY SPLIT UP ITS STOCK

Stockholders of the Baldwin Rubber Company, Pontiac, Michigan, are currently digesting a proposal to split the present 70,000 shares of no par Class A stock four for one into a $1.00 par common stock. Directors of the company also propose to apply for listing on the New York Curb Exchange.

Further refinancing proposals offered by Baldwin directors call for the increase of authorized capitalization to 600,000 shares of new common stock of which 278,764 will be issued in exchange for the present outstanding A stock.

Baldwin earnings for the year ended December 31, 1935, are expected to show in excess of $6.00 a share for the present A stock.

Loss for Seiberling Rubber

For the year ending October 31, 1935, the Seiberling Rubber Company, Akron, reports a net loss of $9,761 which compares with a net loss of $546,689 in the preceding period. No other details have been announced.

Profit for Dayton Rubber

Net profit of $49,565, after taxes, interest, depreciation and other charges were deducted, is reported by the Dayton Rubber Manufacturing Company, Dayton, Ohio, for the year ending October 31, 1935. This profit is equal to $1.06 a share on 46,518 shares of Class A stock. In the previous period Dayton Rubber reported a net loss of $80,819.

Issuing Spanish Rubber Manual

A manual of the rubber industry (Manual de la Industria de la Goma) is being prepared for early issuance by *La Goma*, a Spanish monthly publication devoted to the rubber industry. It is being compiled by Luis Pascual Mejias Lopez and will contain information covering manufacturing processes, physical and chemical properties of rubber, and plantation methods of cultivation. The manual will be sold at 25 pesetas per copy (a peseta is currently worth approximately 14 cents in American money). *La Goma* is located at Calle de Moncada, 4, tienda, Barcelona, Spain.

Issue Chart on Business

An interesting, multi-colored chart showing a century of business progress has been issued by the Cleveland Liner and Manufacturing Company, 5508 Maurice Avenue, Cleveland, Ohio. The chart shows periods of deflation and inflation and indicates the economic trend during wars, over-expansion periods, depressions, etc. In addition to past performances the chart forecasts an upward trend for 1936 and 1937.

DR. SHEPARD JOINS AMERICAN CYANAMID

Dr. Norman A. Shepard, recently elected chairman of the Rubber Division, A. C. S., and for seventeen years associated with research activities of the Firestone Tire & Rubber Company, at Akron, has been appointed Director of Technical Service for the American Cyanamid Company and other companies in the Cyanamid group. He is scheduled to begin his new work on or about February 15 and will have his headquarters in the new Cyanamid Laboratory in Stamford, Connecticut.

Graduated from Yale University in 1913 with a Ph.D. degree, Dr. Shepard was assistant professor of chemistry at the University from 1917 to 1919 joining Firestone in the latter year as director of organic chemical research, a post he held until 1925 in which year he became director of chemical research for the company. He has been a consistent contributor to the technical journals on many pertinent subjects of the rubber industry including pyrimidines, amines, vulcanization, weathering of rubber, cord tire fabric, etc.

In his new post Dr. Shepard will be responsible for the directing of the technical service laboratories at Stamford, the expansion of the sales service laboratories to meet present and increasing needs, and the co-ordination of the technical and sales service work in all of the several divisions of the companies in the Cyanamid group.

Prior to severing his connection with Firestone, Dr. Shepard was the guest of Harvey S. Firestone, Sr., at the latter's home at Miami Beach, Florida. In addition to his A. C. S. membership, Dr. Shepard is also a member of the Sigma Xi fraternity, while his clubs include Torch, Franklin and Akron University.

Set A.S.T.M. Meeting Dates

Atlantic City has been selected as the site for the 39th A.S.T.M. Annual Meeting which will be held June 29 to July 3 at the Chalfonte-Haddon Hall. A Regional Meeting will be held at the Hotel William Penn in Pittsburgh on March 4, while group meetings of the various committees are planned from March 2 through March 6 in the same hotel. In addition to these scheduled meetings a series of local meetings, sponsored by A.S.T.M. district committees, will also be held from time to time.

Russian Plant Meets Quota

The Red Triangle Rubber Plant, in Leningrad, Russia, fulfilled its annual output program for 1935 early last December. Total output was valued at 405,500,000 rubles and included 47,898,000 pairs of rubber footwear. The 1935 quota for tires, rubber balls, and other articles, was completed prior to December.

DR. NORMAN A. SHEPARD

Adamson Factory Busy

Construction activity at the factory of the Adamson Machine Company, at Akron, has been maintained at a high level for several months, according to report. Two presses used in making automobile running boards have recently been shipped to Russia, while another press for processing floor mats for cars, used exclusively by Goodyear and the Baldwin Rubber Company, is rapidly nearing completion. Adamson also has under construction what will probably be the largest vulcanizer in the world. Designed for a 100 pound steam pressure, the vulcanizer will be 15 feet in diameter and 45 feet long. It will be used to vulcanize the interior of railroad tank cars and other large tanks for the transportation and storage of chemicals and other fluids. Adamson recently underwent a reorganization with F. L. Dawes named general manager, E. D. Austin, production superintendent and C. F. Fenn, secretary-treasurer. Controlling interest is in the hands of Cecil Dawson and Messrs. Dawes, Austin and Fenn.

General Introduces Airex

General Tire and Rubber Company, Akron, has introduced a new coating material for the inner walls of tubes known as Airex. Inserted in tubes through the valve stems by means of a special pressure gun, rotation of the wheel on the road spreads Airex over the complete inner area. According to General, the new coating material makes tires run cooler and reduces the possibilities of the natural seepage of air through rubber preventing tire injuries caused by under-inflation. Punctures are said to close up "immediately and permanently" in Airex-treated tubes. The new coating material has been developed by Hans Wagner, a German inventor, and is being marketed through the Dutch Airex Corporation of America, Ltd., of Akron.

BRAZIL INCREASING PRODUCTION STATUS

Although recognized primarily as a rubber cultivation center, Brazil now boasts more than 30 firms engaged in the manufacture of rubber products of all kinds, according to a report from A. W. Childs, American Assistant Commercial Attaché stationed at Rio de Janeiro. These factories employ approximately 5,000 people, utilize about 2,000 tons of crude rubber annually, and are equipped to produce practically every known type of rubber manufacture.

Brazil, for many years the source of more than half of the world's supply of crude rubber, lost much importance after 1910 with the advent of rubber plantations in the Middle East, which are today producing over 95 per cent of the total world shipments of this commodity. Since 1910 the Brazilian Government has done everything possible to encourage the development of a local rubber manufacturing industry, and such efforts appear to have been successful.

The successful production of automobile tires is sometimes considered the test of a newly established rubber manufacturing industry, and Brazil has had a tire factory for several years and a second tire plant with latest modern equipment has recently been completed. Brazilian tire manufacturers hope soon to supply the entire local demand for automobile tires and eventually to export their surplus production to nearby countries.

Shipments to Italy Banned

Effective November 18, the export of rubber from the Netherlands East Indies to Italy and its possessions was prohibited by Royal Decree. The measure applies to all overseas areas owned and controlled by the Netherlands government. Exports of crude rubber, latex, scrap and reclaim from the United Kingdom and non-self-governing British areas to Italian territory were also banned on the same date.

Inland Employes Get Bonuses

Approximately 3,000 employes of the Inland Manufacturing Company, Dayton, Ohio, participated in a $500,000 Christmas bonus given to all employes with the firm during the past six months or more. The bonuses were part of those granted to all General Motors workers, Inland being a subsidiary of that organization.

Lee Continues Hazard Guarantee

The Lee Tire & Rubber Company hazard guarantee, which holds good for 12 months against all road hazards, will be continued in 1936, according to A. A. Garthwaite, general manager. That the Lee guarantee has proved effective is evident, says Mr. Garthwaite, because "adjustment cost has decreased and our sales and customers increased."

TRENTON NEWS

I. Tachna, of New York City, has been made president and general manager of the newly formed Murray Rubber Products Company which has taken over the factory and business of the Murray Rubber Company, at Trenton. Max Kalter, also of New York City, recently purchased the Murray assets for $340,000, as reported last month. It is believed that a merger between the new Murray concern and another Trenton rubber manufacturing company is pending.

Suit has been filed in Mercer Court to recover $16,907 from C. Edward Murray, Jr., former president of the Murray Rubber Company. The suit was instituted by the new company organized by Mr. Kalter and cites a schedule of merchandise and services rendered by the former Murray concern chargeable to Mr. Murray's personal account. According to the terms of the suit, the $16,907 claim was assigned by Alfred H. Branham, who acted as receiver for the Murray Rubber interests for several years, to the take-over company. Mr. Murray, who is vice-president of the Crescent Insulated Wire and Cable Company, Trenton, denies the claim. He resigned the presidency of the former Murray Rubber Company in April of 1930.

The Alling-Waters Rubber Company, with offices at 131 Main Street, in Paterson, N. J., has been incorporated at Trenton with 250 shares of no par value stock. Incorporators included Jesse Waters, 87 Seventeenth Avenue, Paterson, and Clarence and Kenneth Alling, both of Stamford, Conn. The new concern will manufacture a varied line of rubber products.

Karl Genze, comptroller of the Pocono Company, Trenton, was recently made a Kentucky Colonel. The appointment was announced at a gathering of Pocono employes, the commission coming from the office of the Governor of Kentucky.

The will of the late William J. B. Stokes, former prominent rubber manufacturer in Trenton, sets aside the sum of $100,000 in specific bequests for grandchildren in addition to sums for other members of his immediate family. A total of $15,000 was left to the Carolyn Stokes Day Nursery, named after his deceased daughter, while $17,500 was granted to several Trenton hospitals. All personal assets, including property, went to his widow. At the time of his death Mr. Stokes was president of the Joseph Stokes Rubber Company.

Linden Rubber Roller Company has been chartered at Trenton with 2,500 shares at $10 per share to engage in the manufacture of rubber products. Offices of the new company are listed as 46 Bayard Street, New Brunswick. The incorporators are John Molineux, 31 Carlton Road, Metuchen, 98 shares; A. Dudley Watson, Highland Park and Walter Greacen, New Brunswick, one share each.

Personals: M. H. Martindell, vice-president, Joseph Stokes Rubber Company, Trenton, has been visiting Canada and the West Coast. Benjamin M. Rosenthal, president, Nearpara Rubber Company, Trenton, is recuperating in Florida following a lengthy illness. Horace B. Tobin, president, Woven Steel Hose and Rubber Company, Trenton, spent last month on a vacation in the West Indies.

ACTICARBONE SUES NATIONAL CARBON CO.

The Acticarbone Corporation, New York City, filed suit against the National Carbon Company on January 7th in the United States District Court for the Southern District of New York. The suit takes the form of a petition for declaratory judgment seeking an adjudication of the Chaney patents on activated carbon owned by National Carbon. Although these patents were found to be wholly invalid by Judge Sater, sitting as special master in the Southern District of Ohio, Eastern Division, no action has as yet been taken by the Court on Judge Sater's report.

Acticarbone's patents covering the processes and apparatus for the manufacture and use of Acticarbone's activated carbon, as well as the product itself, are not involved in any way in this or any other litigation.

Acticarbone is being represented by Pennie, Davis, Marvin & Edmonds, and National Carbon by Watson, Bristol, Johnson & Leavenworth, both firms of New York City.

NEW ENGLAND NEWS

The total industrial payroll in Naugatuck, Conn., largely accounted for by the footwear and allied plants of U. S. Rubber Products, Inc., showed a substantial increase in December as compared with November, 1935, and December, 1934. The borough's total payroll for December, 1935, was $674,179.

Nineteen drivers in the trucking department of U. S. Rubber have transported goods over 700,000 miles during a period of 20 years without an accident, it was revealed recently. Each driver has been awarded a certificate and pin by the National Safety Council. Hugh McSherry, department head, leads the list with a record of 250,000 miles of accident-free operation in 20 years.

Stamford Rubber Supply Company, Stamford, Conn., has registered a tradename for the Viscol Company, which will operate in quarters adjacent to the main plant. A new metal warehouse building is being erected by the company at a cost of $3,000.

Attributed to static electricity, fire in the churn room of the Goodyear Rubber Company, Middletown, Conn., January 24, caused damage estimated at several hundreds of dollars. The room where the flames broke out is used for mixing of rubber cement.

Shoe Hardware Mfg. Company, Waterbury, Conn., maker of fasteners for rubber footwear, has joined with five other American slide fastener manufacturers in an appeal to the Federal Tariff Commission for protection against low-price Japanese competition. A quota system to limit imports has been asked.

"Business since 1885 has been 16 times below normal and 14 times above normal, and there is never any assurance that business will remain normal for any length of time," declared Farnham Yardley, president of Jenkins Bros. Company, Bridgeport, Conn., at the 15th annual banquet of the Jenkins Bros. Veterans' League, held on January 30 in the Stratfield Hotel. He said the company had made tremendous strides since 1931.

Two employes were awarded 50-year service bars, while awards for periods of 45 and 30 years were also made. Bernard J. Lee, vice-president and general manager, was toastmaster. F. H. Braithwaite and R. C. Gerte, sales manager and superintendent, respectively, of the company's rubber division, were among the guests. The league presented a bronze plaque to President Yardley.

Daniel G. Weinstein, for the past 14 years income tax agent in the New Haven, Conn., office of the Internal Revenue Bureau, has been appointed comptroller of the Armstrong Rubber Company, West Haven. His resignation as a tax agent became effective January 31.

Names in the News

GEORGE W. STEPHENS has been re-elected president and general manager of the Mansfield Tire & Rubber Company, Mansfield, Ohio. Other officers of the company were also re-elected at a stockholders' meeting held last month.

GEORGE H. CADY, formerly with the General Laboratories of U. S. Rubber Products, Inc., in Passaic, N. J., has joined the Columbia Chemical Division of the Pittsburgh Plate Glass Company as research chemist.

HARRY E. BLYTHE, assistant to the president, Goodyear Tire & Rubber Company, Akron, spoke on "The Business Outlook for 1936" before members of the Akron Optimist Club at a luncheon in the Mayflower Hotel on January 22.

RAY E. BLOCH, heretofore vice-president and treasurer of the Mohawk Rubber Company, Akron, has been named president of that company to succeed CHARLES BORLAND recently resigned. Over a period of years, Mr. BLOCH has held virtually every executive office in the Mohawk concern except that of sales manager.

R. DAVISON, advertising manager, New Jersey Zinc Company, New York City, writes on "1936 Advertising Opportunities" in the January, 1936, issue of *Industrial Marketing* which was the Annual Forecast and Review Number of that publication.

E. J. SMITH, president, White Rubber Company, Ravenna, Ohio, was re-elected president of the Ravenna City Board of Education last month. He has held the position for several years.

FRANKLIN BRADSHAW, plantation superintendent for the Firestone Tire & Rubber Company in Liberia, has returned to this country on a three months leave after an extended stay in the African country.

WILLIAM M. BECHLER, assistant comptroller, B. F. Goodrich Company, Akron, was named potentate of Tadmor Temple at the annual meeting of the Shrine last month at Akron's Masonic Temple.

HARVEY FIRESTONE, Jr., accompanied by his wife and brother, Roger, sailed early last month on the Empress of Britain for Africa where he intends to spend some time overlooking construction activity at the Firestone factory being erected in Capetown.

EDWARD S. CONNER, recreational director, Goodyear Tire & Rubber Company, Akron, was the guest speaker at a luncheon meeting of the Hudson Rotary Club at Hudson, Ohio, on January 15.

FLOYD YATES KEELER, of Orvis Bros. & Company, New York City, was elected president of the Commodity Exchange, Inc., by the board of governors at a meeting held on January 23. In accepting the post he predicted an active demand for commodities based on general business recovery.

H. A. BAUMAN, general sales manager, sundries division, B. F. Goodrich Company, addressed the January Goodrich management dinner and forum in Polsky's Tearoom, in Akron, on January 16. He spoke on the problems of distributing sundries.

E. R. BRIDGWATER, manager, Rubber Chemicals Division, E. I. du Pont de Nemours & Company, Wilmington Delaware, is scheduled to address a meeting of the Society of Chemical Industry, American Section, at the Chemists Club in New York City on February 21. His paper is entitled "Economics of Synthetic Rubber."

ROY J. DEVEREAUX has been appointed tire sales manager of Canadian Goodrich Company, Ltd., Kitchener, Ontario, Canada. He has been a member of Goodrich since 1914 and served as manager of the Cleveland district since 1929. L. C. MCGINLEY succeeds him in the Cleveland post.

E. J. THOMAS, former general superintendent of the Goodyear plants in Akron, who has been serving as managing director of the Goodyear Tyre & Rubber Company, Ltd., at Wolverhampton, England, for the past year, returns to his home office some time this year. During his services in England the general superintendent post at Akron was not filled.

WILLIAM M. RAND has been elected president of the Merrimac Chemical Company, a subsidiary of the Monsanto Chemical Company, which maintains factories at Everett, Massachusetts. He joined Merrimac in 1919 and has been vice-president in charge of sales since 1923.

CARL L. REED has been appointed manager of the export department of the Kelly-Springfield Tire Company, Cumberland, Maryland. For the past eight years he has represented Fisk Rubber in Brazil and prior to that served as sales representative for Miller Rubber covering the Caribbean territory.

GEORGE M. MADOLE, assistant managing director of Goodrich S. A., Colombes, France, has been made a member of the French Legion of Honor in "recognition of distinguished services in French industry." Mr. Madole has been a Goodrich executive since 1910.

H. S. STOLLER

Named sales agent for the carbon blacks produced by the Imperial Oil and Gas Products Company, Pittsburgh, Pennsylvania, as reported in our last issue, H. S. Stoller (above) is already contacting rubber manufacturers in his assigned territory which covers the rubber industry in the State of Ohio. Mr. Stoller maintains an office at 31 North Summit Street, in Akron.

R. S. WILSON, vice-president and sales manager, Goodyear Tire & Rubber Company, denied the rumor last month that he intends to accept a position with the Chrysler Corporation at Detroit. He stated he "knew nothing" about any such change.

W. C. ROBERTS, manager, battery department, B. F. Goodrich Company, Akron, has been granted a patent by the United States Patent Office for a new and improved type of container for automobile storage batteries. Rights to the patent have been assigned to Goodrich.

R. M. MCGUIRE, formerly with the research and new products divisions of the Goodyear Tire & Rubber Company, has been appointed director of sales for the St. Clair Rubber Company, Marysville, Michigan, according to an announcement by C. A. PFEFFER, general manager.

C. W. SEIBERLING, vice-president, Seiberling Rubber Company, Akron, was scheduled to be one of two guests of honor at a birthday dinner planned for February 13 at the Akron Armory. He was to have been honored for his life-long work in the furtherance of the boy and girl scout movement in Akron.

FRANK L. SHEW, for nine years rubber chemist and compounder of the Aetna Rubber Company, Ashtabula, Ohio, is now serving as chief chemist for the Henrite Products Company, Ironton, Ohio.

TIRE MAKERS RECEIVE PROCESS TAX REFUNDS

Tire manufacturers in and around Akron benefitted materially last month when as a result of the Supreme Court's decision, processing tax payments being held in escrow were refunded. Practically every tire manufacturer in the country received some refund.

It is considered extremely doubtful whether legal suits will be instituted by any of the tire makers to force a refund of any of the amounts paid to the government over a 20-month period. The rubber industry has been paying approximately 25 cents per tire as the cotton processing tax.

Among the companies receiving tax refunds, and the amounts rebated from sums held in escrow, were the following: Goodyear Tire & Rubber Export Co., $102,608; Firestone Tire & Rubber Export Co., $65,011; International B. F. Goodrich Co., $41,799; Goodyear Clearwater Mills, $2,314; Goodyear Tire and Rubber Co., $24,629; Goodyear Fabric Corp., $3,130; General Tire & Rubber Export Co., $14,380; and Seiberling Rubber Co., $5,193.

The processing taxes on cotton were estimated to have been costing the leading tire manufacturers, directly or indirectly, between $15,000,000 and $20,000,000 annually. The tax was absorbed by the manufacturers since tire prices were not increased. No suits were instituted by members of the industry seeking to recover payments until the Supreme Court was presented with the problem of ascertaining the constitutionality of the collecting of the tax.

Describes Calender History

Trials and tribulations of the pioneers who made calendering operations possible in the rubber industry are discussed in the latest mailing piece issued as part of a series by the General Atlas Carbon Company, New York City. The romance behind the creation of the "Monster Machine" by Edwin M. Chaffee in the middle of the nineteenth century is well told. It is a peculiarity of the rubber industry that this machine, the basis for future calenders, was bid in, including its patents, for the sum of six dollars when the Roxbury Rubber Company, with which Mr. Chaffee was associated, met with financial difficulties.

Purchases Oak Hill Mortgage

On January 10, W. A. Byrider, Jr. purchased the mortgage covering all collateral of the Oak Hill Rubber Company, of Oak Hill, Ohio, giving him full possession of the land, building and all of the company's machinery. According to L. P. Waldron, vice-president and general manager of Oak Hill, the company will continue operations under the present management, no changes being immediately contemplated.

Exhibit First Rubber Mold

A mold for making rubber pads for horseshoes, used by the B. F. Goodrich Company in 1879, was recently exhibited before a dinner of the Goodrich mechanical rubber goods division held in Akron. The mold (illustrated herewith) is believed to be the first mold used in the rubber industry. It was used for making an article known as a "frog" pad, the article being placed between the horseshoe and frog of a horse's hoof, and was a popular item of the day. A. E. Moon, production superintendent of the Goodrich mechanical division for the last ten years, is seen holding the original mold.

Improving Official Statistics

Designed to improve the accuracy of official statistics covering imports and exports of rubber, allied gums, and products manufactured from these materials, the Leather and Rubber Division of the Department of Commerce has compiled and issued two new circulars, i.e., Glossary of Rubber Products Exported and Instructions to Exporters, 1936 (Special Circular 3600), and Official Classification of U. S. Imports of Crude Rubber and Allied Materials and Manufactures Thereof (Circular 3577—Revised). A great many changes of classifications were introduced into the schedules covering imports and exports, effective January 1, 1936, and these circulars provide information regarding the classifications now in effect on all items directly affecting the rubber industry. Copies of both circulars are available without charge from the Leather and Rubber Division.

To Hold Safety Conference

The Seventh Annual Greater New York Safety Conference will be held at the Astor Hotel, in New York City, on March 3, 4 and 5. Thirty-three sessions have been planned to cover practically all recognized phases of safety. Offices for the Greater New York Safety Conference are maintained at 9 East 41st Street, in New York City.

OBITUARIES

C. Olin North

C. Olin North, the well-known rubber chemist, died on February 5, as the result of an explosion of a vacuum still in the laboratory of Ohio-Apex, Inc., at Nitro, West Virginia. Mr. Olin was manager, as well as a large stockholder, of the Ohio-Apex company, which he founded in 1929, shortly after he left the Rubber Service Laboratories Company, of Akron, where he had been secretary-treasurer and development manager since 1921. Born in 1891, at Dubois, Penna., Mr. North was graduated from the Carnegie Institute of Technology in 1914, and immediately joined the Republic Rubber Company, at Youngstown, Ohio, as an analyst and research worker. From 1916 to 1921 he was with Goodyear, in the compounding and research department, where his developments and patents on accelerators led to his connection, in 1921, with Rubber Service Laboratories. Mr. North was a member of various clubs and societies, including the American Institute of Engineers, A. C. S., Chemists' Club (New York), Portage Country Club, and the Akron City Club. During the war he was a major in the U. S. Chemical Warfare Service. He is survived by his wife, Margaret, and three sons, Edward, Thomas, and Phillip.

Joseph W. Marsh

Joseph W. Marsh, vice-chairman of the board of the General Cable Corporation, died at his home on Woodland Road, in the Squirrel Hill section of Pittsburgh, Penna., on January 31, at the age of 77. Born in New York, Mr. Marsh was a teacher of bookkeeping and shorthand prior to his joining the Standard Underground Cable Company as secretary to the founder. He was president of Standard when it merged with General Cable several years ago. He leaves a widow, three daughters and a son.

William H. Stradling

William H. Stradling, for many years a foreman for the Vulcanized Rubber Company, Morrisville, Penna., died last month at the age of 72 after a lengthy illness. He was retired on a pension by the Vulcanized company several years ago. Burial was in Morrisville.

John W. Whelan

John W. Whelan, popular sales representative of the John A. Roebling's Sons Company, of Trenton, for twenty-two years, died at his home in Washington, D. C., on January 31, after a brief illness. Surviving are his widow, two sisters and three brothers.

TIRE EXPORTS DECLINE IN NINE-MONTH PERIOD

Exports of pneumatic tires by principal tire manufacturing countries in the first nine months of 1935 declined 14.2% as compared with the same period in the preceding year, the figures being 3,454,000 units in 1935 as compared with 4,026,000 units in 1934. Only two countries—Italy and Germany—showed increased shipments. Comparative statistics for the principal tire manufacturing countries, made available by the Bureau of Foreign and Domestic Commerce, follow:

United States, from 892,000 casings in the first nine months of 1934 to 695,000 casings in the first nine months of 1935, a loss of 22.1%; Canada, 625,000 to 568,000, loss of 9.1%; France, 431,000 to 383,000, loss of 11.1%; Italy, 321,000 to 326,000, increase of 1.6%; United Kingdom, 1,058,000 to 982,000, loss of 6.2%; Germany, 112,000 to 135,000, increase of 20.5%; Japan, 176,000 to 162,000, loss of 8%; and Belgium, from 411,000 to 203,000, loss of 50.6%.

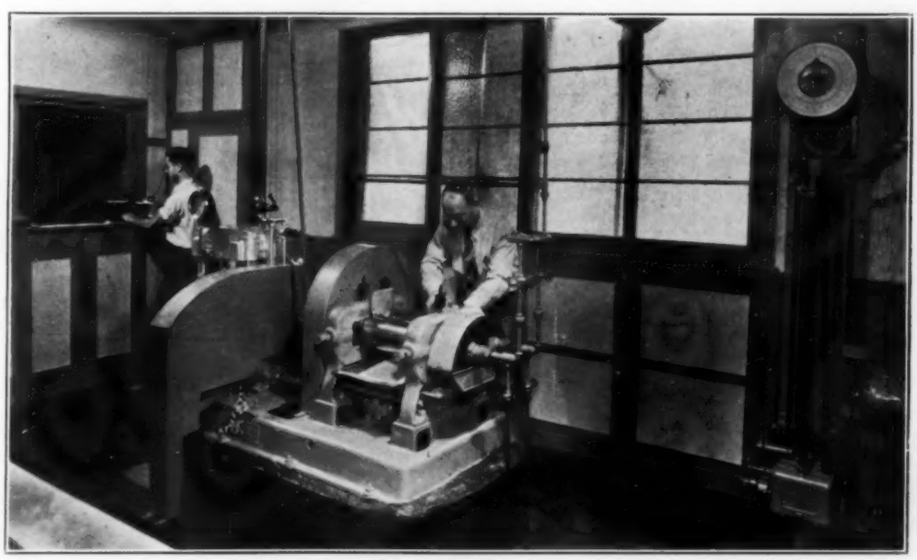
Should the rate of decline of 14.2% of the first nine months of 1935 obtain for the entire year, estimated world tire exports in 1935 would be 4,490,000 units as compared with 5,233,000 in 1934.

African Plant for Firestone

Erection of a factory for the manufacture of tires and tubes in Port Elizabeth, South Africa, has been announced by the Firestone Tire & Rubber Company, of Akron, with completion of the buildings scheduled for the early future. This makes the second tire and tube factory to be constructed in the Union of South Africa in recent months, Dunlop having opened a plant in Durban, in the State of Natal, recently. Both the General Motors and Ford organizations operate assembly plants in Port Elizabeth close to the site of the new Firestone factory.

Rubbercraft Laboratory

Completion of one of the finest research laboratories on the West Coast has been announced by the Rubbercraft Corporation of California, Ltd., of Los Angeles. Equipment and furniture installed in the new laboratory, seen at the right, represented an outlay of more than $5,000 according to Charles Merralls, president of the company. Fred King, California Institute of Technology graduate, is in charge of the new laboratory, while F. N. Merralls, a graduate of the same institution, has been named consulting engineer. Equipment in the laboratory includes mills, presses and various testing devices.



A Rubber Glider

A rubber glider, which fits into an ordinary suitcase when deflated, has been developed by Russian inventors. Upon removal from its case, the glider is stretched out on the ground and hard rubber parts are inserted in various places, including the tailpiece, air then being pumped into the glider through provided valves. Weighing 92 pounds, the rubber glider is 29 feet long and has a 30 foot wingspread. Tests in use have indicated that the glider does not collapse and obeys the controls of flight.

Manufacturing "Rubbertex"

Preparatory to engaging in production of a sponge rubber product commercially termed "rubbertex," new machinery and equipment is being installed in the factory of the Standard Products Company at Port Clinton, Ohio. The new product is described as being suitable for use in connection with the construction of automobile bodies and also as an insulating material for building construction. An auxiliary building is also being erected by the Standard concern.

Honor Johnson Officials

A banquet in honor of the officials of the Johnson Rubber Company was tendered on December 20 by the Middlefield (Ohio) Board of Trade. The banquet was a gesture of appreciation for the employment given local help by the company, as well as for the cooperation displayed in connection with various municipal endeavors. Both Hugh and Smith Johnson, leading company officials, thanked the members of the board of trade for the affair.

Labor Troubles Threaten

Intimations of coming difficulties with union workers were indicated at plants of Goodyear, Goodrich and Firestone, at Akron, last month. Protesting the suspension of Clayton Dicks, a union man, who admitted to attacking a non-union worker, one thousand Firestone employes "sat down" on January 29 and temporarily tied up factory operations in the tire building department. The protest was ironed out in a day or two with the "sit down" workers receiving half-time pay for the hours spent in idleness. A similar "sit down" protest was experienced in the Goodyear factory when workers in the pit curing room protested against a 10% cut in the piece work rate. Started on February 3 this protest ended the following day when the management gave the idle workers fifteen minutes to return to work or forfeit their employment. At Goodrich, tire builders "sat down" in protest of the time allowed in changing from one machine to another, but this, too, was quickly settled.

Dunlop Seeks Panama Site

The Dunlop Rubber Company, Ltd., Birmingham, England, is understood to be negotiating with authorities toward the establishing of a factory in Panama. According to reports it is not the company's intention to manufacture on a wide scale but to utilize the site as an "assembly" and distributing depot to serve the Latin-American countries.

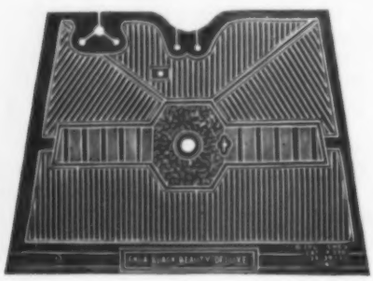
Form De Luxe Rubber Firm

The De Luxe Rubber Company was incorporated to conduct business in the State of Ohio on January 23, incorporation being for $6,250. Incorporators included J. B. Morgan, E. N. Rothwell, H. J. Rothwell and J. P. Riddle. No further details were made available other than that De Luxe would utilize an Akron factory.

New Rubber Goods

Eclat Improved Auto Mats

A new line of replacement auto mats, incorporating many improvements, has been introduced by the Eclat Rubber Company, Akron, Ohio. The front com-



partment types feature a double reinforced heel rest panel. There are three sizes of rear compartment mats. The "Deluxe" models have extra-heavy, deep corrugations, while the "Standard" models have herringbone designs. All models have attractive borders around the cut-outs and edges. The line includes all-rubber and felt-back types. The latter types are latex treated, spraying of the felt with latex binding the felt fibre ends securely, providing better insulation against motor noise and fumes, and preventing scuffing. Treatment with latex also makes the felt water repellent.

Pflueger Comfo Ring

One of the latest devices to ease the fisherman's burden is an all-rubber Comfo ring, made by the Enterprise Manufacturing Company, of Akron, under its "Pflueger" brand name. Composed of soft rubber, this ring was especially designed for use on

reels made by the company and appeals particularly to the caster accustomed to "palm" the reel while retrieving line since it cushions the edge and eliminates cramping or fatigue. The rubber ring is so shaped that it fits snugly over the back or tail plate of reels, having ears at intervals through which it can be firmly secured to the reel by the back-plate screws.

Henley's Rubber Mallet

An implement which lends itself to a variety of uses has been introduced by the Henley Tyre and Rubber Co., Ltd., 20 Christopher Street, London, E. C. 2, England. Termed the "Rallit" it is a well-balanced rubber mallet which is said to accomplish every function of wooden mallets and having the added advantage of longevity. The "Rallit" is, of course, made of hard rubber.

Davol Milk Bottle Cap

For protection of bottled milk and "formula," the Davol "Anti-Germ" milk bottle caps, equipped with the patented tab, is being featured by the Davol Rubber Company, of Providence, Rhode Island. Made of trans-

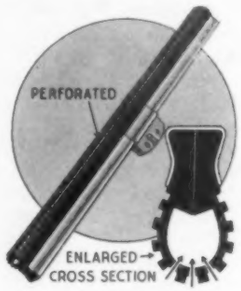
parent rubber, these caps guard against dust and germs. They cover the entire rim of the bottles, excluding ice-box odors. They also provide against possible leakage. The extending tab keeps germ-laden fingers away from the edges or rims of bottles. The Davol milk bottle caps when wet slip easily over the milk bottle rims.

Goodrich "Store-Door" Tires

For half-ton and one and one-half ton trucks used in city delivery service, the B. F. Goodrich Company, Akron, has introduced a new line of tires known as the "Store Door" series. Carrying capacities range from 1050 pounds to 2200 pounds. The line was developed to meet a demand for tires giving longer wear where frequent starts and stops are made in delivery work, such as milk routes, food and grocery deliveries, florists, laundries, etc. Average weight of the tread on each of the "Store-Door" tires is 47% greater than that of a comparable size tire; tread design depth and tread width average 30% greater; and the actual rubber contact area with the pavement 42% greater.

Rex-Hide Wiper Blade

Made of a special, soft rubber, with a hollow perforated tube running its entire length, Rex-Hide, Inc., of East



Brady, Pennsylvania, has introduced the Rex-Hide Balloon Wiper Blade. Ten flexible wiping ribs create alternate areas of pressure and suction with the stroke, drawing water into the hollow tube through the perforations. The self-cleaning operation prevents the same water from being smeared back and forth across the windshield. Because of the balloon construction the new blade will hug even a warped glass and wipe it clean. For extreme ice and snow, an ordinary pipe cleaner can be dipped in glycerine, bent at one end, and hung inside the hollow tube of the blade, thus maintaining a glycerine film on the windshield for several hours at a stretch removing sleet and preventing ice formation on the glass.

Du Pont Pontine Fabric

A new rubber upholstery fabric, termed Pontine, has recently been introduced by the Fabrikoid Division, E. I. du Pont de Nemours & Co., Inc., Fairfield, Conn. Said to have been field tested for three years as a covering for seat cushions and seat backs, Pontine is claimed to be waterproof, high in tensile strength, sun resisting and long lasting. For economical handling, Pontine, in all qualities and colors, comes 54 inches wide.

Republic Oil-Resisting Hose

Designed especially to overcome the deteriorating effects of hot oil from air compressors, a new air hose has been announced by the Republic Rubber Company, Youngstown, Ohio. The tube is

made from a compound similar to that used in oil conducting hose and can be saturated with oil for long periods of time without injury to its serviceability. Increased strength is said to be a factor of the new hose made possible by constructing the plies from a specially twisted cord which is impregnated with a new rubber compound, this construction also increasing the bursting and working pressures. Republic recommends its use in mines, quarries, rock industries, road work, and general industrial work calling for severe service.

MARKETS

RUBBER—COTTON AND FABRICS—CHEMICALS

NEW YORK, FEBRUARY 10, 1936

Crude Rubber

THE steadily improving world statistical position of rubber, plus a revival of inflation talk at Washington, carried crude rubber prices for spot on the Exchange early this month into the highest peak reached in more than a year. Prices have climbed one and a half cents since our last report, high for the month being 15.46 quoted on February 7, low being 13.95 on January 10. In view of the fact that there has been a considerable let-up in factory demands it is evident that the favorable statistical position, including reduction of world stocks and increased consumption in the United States, is holding up both spot and future prices despite persistent reports that both British North Borneo and Ceylon will be given increased quota allotments by the International Rubber Regulation Committee. Some hesitancy, however, has been experienced at the new high levels. Quotations in the outside market, Exchange, London and Singapore, follow:

As of February 10

Plantations—

Ribbed Smoked Sheets—			
No. 1 Spot	—	@	.15⅜
April-June	—	@	.15⅛
No. 2	—	@	.15⅝
No. 3	—	@	.15¼
No. 4	—	@	.15⅛
Thin Latex Crepe	—	@	.15⅜
Thick Latex Crepe	—	@	.15⅝
Brown Crepe, No. 1	—	@	.15⅞
Brown Crepe, No. 2	—	@	.15¼
Amber Crepe, No. 2	—	@	.15⅞
Amber Crepe, No. 3	—	@	.15¼
Amber Crepe, No. 4	—	@	.15⅛
Brown Crepe, Rolled	—	@	.15

Latex—

Liquid Latex, per gal.	.59	@	.60

Paras—

Up-River, fine	—	@	.13
Acre Bolivian, fine	—	@	.13¼
Balata—			
Block, Ciudad	—	@	.32

LONDON MARKET

Standard Smoked Sheets—Buyers—February 10			
February	—	@	7 7/16d
April-June	—	@	7 7/16d

SINGAPORE MARKET

Standard Smoked Sheets—Sellers—February 10			
February	—	@	7 3/32d
April-June	—	@	7 3/32d

Reclaimed Rubber

Conditions continue to improve after the usual holiday lull although they have not yet returned to the pre-holiday basis. Reclaimers voice optimism for the balance of the year, especially with crude rubber prices rising as rapidly as they are. Prices remain unchanged since our last report.

High Tensile

Super-reclaim, black	lb.	.08¾	@	.09
High Tensile Red	lb.	.07	@	.07¼

Shoe

Unwashed	lb.	.06½	@	.06¾
Washed	lb.	.08	@	.09

Tube

No. 1 (Floating)	lb.	.14	@	.14¼
No. 2 (Compounded)	lb.	.07	@	.07¼
Red tube	lb.	.06½	@	.07¼

Tires

Black	lb.	.05	@	.05¼
Black, selected tires	lb.	.05¼	@	.05½
Dark Gray	lb.	.06¼	@	.06½
White	lb.	.09¼	@	.09½
Truck, Heavy Gravity	lb.	.05½	@	.06
Truck, Light Gravity	lb.	.06	@	.06¼

Miscellaneous

Mechanical blends	lb.	.03½	@	.04½

Scrap Rubber

Collection of scrap has fallen off due to the poor weather in recent weeks, with continued interest being shown by reclaimers. Prices on inner tubes have increased slightly due to decreased stocks. Mixed auto prices also increased slightly since our last report. Current quotations follow:

(Prices to Consumers)

Auto tire peelings	ton	17.50	@	19.00
Mixed auto	ton	8.00	@	9.00
Clean solid truck tires	ton	34.00	@	36.00
Boot and shoes	ton	21.50	@	23.00
Arctics, untrimmed	ton	17.50	@	19.00
Inner tubes, No. 1	lb.	.08¼	@	.08¾
Inner tubes, No. 2	lb.	.03¾	@	.04
Inner tubes, Red	lb.	.03⅝	@	.03¾

Cotton

Cotton prices have been highly irregular since our last report moving in a 50 point range for the period. The irregularity of prices was due to nervousness on the part of the cotton trade which is anxiously awaiting disposition of new farm legislation to replace the AAA, decisions as to the extension of renewal of 12 cent loans on 4,500,000 bales of cotton, and indications of a more settled goods market. High for the month was 11.95 touched on several days in the period, with a low of 11.45 being reached on February 5 as the result of the release of pool cotton and announcement of plans for the liquidation of all government-held stocks as proposed to Congress. Consumption of cotton in the United States is running well ahead of last year. Prices will probably continue erratic until some definite farm program is arranged. Quotations for middling uplands on the New York Cotton Exchange follow:

	January 9	February 10		
	Close	High	Low	Close
February	....	11.41	11.41	11.41
March	10.90	11.27	11.18	11.26
May	10.51	10.87	10.81	10.85

Tire Fabrics

(Prices Net at the Mill)

Peeler, carded, 23/5/3	lb.	.29	@	.29½
Peeler, carded, 23/4/3	lb.	.30	@	.30½
Peeler, carded, 15/3/3	lb.	.27	@	.27½
Peeler, carded, 13/3/3	lb.	.26	@	.26½
Egyptian, carded, 23/5/3	lb.	.43	@	.43½
Egyptian, combed, 23/5/3	lb.	.48	@	.48½
CHAFERS				
Carded, American, 1⅛"	lb.	.29	@	.29½
Carded, American, 1"	lb.	.27	@	.30½
LENO BREAKER				
Carded, American, 1⅛"	lb.	.30	@	.30½
Carded, American, 1"	lb.	.28	@	.28½

Sheetings

Count	Width	Weight			
48x40	36 in.	5.50	lb.	—	@ .04⅞
40x40	36 in.	6.15	lb.	—	@ .04⅜
40x36	36 in.	6.50	lb.	—	@ .04⅛
48x48	40 in.	2.50	lb.	—	@ .09
48x48	40 in.	2.85	lb.	—	@ .08¼
56x60	40 in.	3.60	lb.	—	@ .07⅞
48x44	40 in.	3.75	lb.	—	@ .06⅝
44x40	40 in.	4.25	lb.	—	@ .06⅛

Ducks

Enameling	lb.	.29	@	.29½
Belting and Hose	lb.	.26½	@	—
Single filling, A grade	lb.	.13½	@	.14½
Double filling	lb.	.14½	@	.15

Closing Rubber Prices on New York Commodity Exchange, Inc.

No. 1 Standard Contract of 10 tons

FROM JANUARY 10 TO FEBRUARY 10

Date	Spot	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Sales
Jan. 10	13.95	13.94	14.02	14.11	14.18	14.26	14.32	14.39	14.47	14.55	14.63	14.71	14.79		223
11	14.12	14.12	14.20	14.28	14.34	14.40	14.47	14.54	14.61	14.68	14.76	14.84	14.92		207
12															
13	14.15	14.07	14.17	14.27	14.34	14.41	14.49	14.56	14.62	14.69	14.77	14.85	14.93		174
14	14.27	14.20	14.29	14.38	14.45	14.53	14.60	14.68	14.75	14.82	14.90	14.96	15.02		382
15	14.44	14.34	14.43	14.51	14.58	14.65	14.72	14.79	14.87	14.96	15.03	15.09	15.16		423
16	14.38	14.36	14.45	14.54	14.61	14.68	14.75	14.83	14.91	14.99	15.05	15.11	15.18		236
17	14.25	14.23	14.32	14.41	14.49	14.57	14.63	14.69	14.77	14.85	14.92	15.00	15.08		152
18	14.15	14.10	14.19	14.28	14.36	14.44	14.50	14.56	14.64	14.72	14.78	14.85	14.92		115
19															
20	14.31	14.25	14.34	14.43	14.51	14.59	14.65	14.71	14.77	14.84	14.90	14.97	15.04		272
21	14.38	14.34	14.42	14.51	14.58	14.66	14.72	14.79	14.85	14.92	15.00	15.08	15.16		208
22	14.63	14.54	14.60	14.67	14.75	14.83	14.89	14.96	15.02	15.09	15.16	15.24	15.32		363
23	14.68	14.63	14.70	14.77	14.83	14.90	14.97	15.04	15.11	15.19	15.27	15.35	15.43		409
24	14.93	14.85	14.88	15.00	15.06	15.12	15.17	15.22	15.30	15.39	15.47	15.55	15.63		644
25	15.00	14.90	14.93	15.05	15.10	15.15	15.21	15.28	15.34	15.41	15.50	15.57	15.65		107
26															
27	15.06	15.01	15.03	15.06	15.12	15.18	15.25	15.32	15.39	15.46	15.55	15.63	15.69		288
28	15.00	14.93	14.95	14.98	15.05	15.12	15.19	15.25	15.32	15.40	15.46	15.52	15.58		273
29	14.87	——	14.82	14.89	14.95	15.02	15.09	15.16	15.24	15.32	15.37	15.43	15.49		346
30	14.85	——	14.78	14.85	14.91	14.97	15.02	15.08	15.14	15.20	15.27	15.35	15.43		246
31	14.93	——	14.86	14.93	14.99	15.05	15.11	15.17	15.23	15.29	15.36	15.43	15.51		228
Feb. 1	15.06	——	14.97	15.04	15.10	15.16	15.23	15.30	15.36	15.42	15.46	15.54	15.63	15.70	175
2															
3	15.18	——	15.13	15.20	15.24	15.28	15.34	15.41	15.47	15.53	15.60	15.67	15.75	15.83	293
4	15.06	——	14.98	15.05	15.10	15.15	15.21	15.26	15.32	15.38	15.45	15.52	15.60	15.68	283
5	15.12	——	15.06	15.13	15.17	15.21	15.26	15.32	15.38	15.44	15.50	15.57	15.64	15.71	99
6	15.25	——	15.25	15.31	15.36	15.41	15.46	15.52	15.57	15.63	15.69	15.75	15.81	15.87	304
7	15.46	——	15.36	15.42	15.47	15.53	15.57	15.62	15.68	15.75	15.80	15.86	15.92	15.98	275
8	15.44	——	15.40	15.45	15.51	15.56	15.58	15.60	15.66	15.72	15.79	15.86	15.94	15.92	86
9															
10	15.38	——	15.36	15.39	15.44	15.49	15.53	15.58	15.64	15.70	15.76	15.83	15.90	15.95	82

Rubber CHEMICAL Markets

NEW YORK, FEBRUARY 10, 1936

[All Quotations F.O.B. Works Unless Otherwise Noted]

ACCELERATORS

Organic				
A-1 (Thiocarbanilid)	lb.	.21	@	.25
A-5-10	lb.	.33	@	.36
A-7	lb.	.53	@	.65
A-11	lb.	.60	@	.75
A-16	lb.	.55	@	.65
A-19	lb.	.56	@	.75
A-32	lb.	.70	@	.80
A-17	lb.	—	@	—
Aldehyde ammonia, crystals	lb.	.65	@	.70
Altax	lb.	—	@	—
Captax	lb.			
Crylene	lb.	.55	@	.65
paste	lb.	.45	@	.55
Di-Ortho-Tolyguanidine	lb.	.44	@	.47
Diphenylguanidine	lb.	.35	@	.37
Ethylidene aniline	lb.	.45	@	.47½
Formaldehyde aniline	lb.	.37½	@	.42
Guantal	lb.	.42	@	.51
Heptene	lb.	.40	@	—
Hexamethylene-tetramine	lb.	.37	@	—
Lead Oleate, No. 999	lb.	.13	@	—
Witco	lb.	.11	@	—
Lithex	lb.	.18	@	.20
Methylenedianiline	lb.	.36	@	.37
Monex	lb.	3.25	@	—
Oxynone	lb.	.68	@	.80
Phenex	lb.	.50	@	.55
Pipsolene	lb.	3.55	@	4.00
R & H 40	lb.	.40	@	.41
R & H 50	lb.	.40	@	.41
R-2	lb.	1.55	@	1.90
Safex	lb.	1.20	@	1.25
SPDX	lb.	.75	@	—
Super-Sulphur No. 1	lb.			
No. 2	lb.			
Thiocarbanilid, drums	lb.	.21	@	.25
Trimene	lb.	.75	@	—
base	lb.	1.20	@	—
Triphenylguanidine	lb.	.58	@	.60
Tuads	lb.			
Ureka	lb.	.62	@	1.00
Ureka B	lb.	—	@	—
Ureka C	lb.	.58	@	.69
Vulcanex	lb.			
Vulcone	lb.			
Vulcanol	lb.			
Z-88-P	lb.	.48	@	.60
Zimate	lb.			
Inorganic				
Litharge, domestic	lb.	.06½	@	—
Magnesia, calcined, heavy	ton	60.00	@	65.00

COLORS

Blacks (See Compounding Materials)

Blues				
Prussian	lb.	.37	@	.39
Ultramarine	lb.	.12	@	.14
Browns				
Sienna, Italian	lb.	.06	@	'13
Umber, Turkey	lb	.04	@	.04½
Greens				
Chrome, light	lb.	.20	@	.30
medium	lb.	.21	@	.31
Chromium Oxide, bbl.	lb.	.22	@	.23
Guignet's Green	lb.	.70	@	—
Reds				
Antimony				
crimson, 15/17	lb.	.48	@	—
sulfur, free	lb.	.48	@	.60
Indian English	lb.	.09	@	.10
Domestic (Maroon)	lb.	.11	@	—
Red oxide, pure	lb.	.10	@	.12
Rub-Er-Red, f.o.b Easton	lb.	.09½	@	—
Whites				
Cryptone CB, No. 21	lb.	.06	@	.06¼
Cryptone, No. 19	lb.	.06	@	.06¼
Cryptone, ZS-20	lb.	.10¾	@	.10¾
Cryptone, ZS-86	lb.	.10½	@	.10¾
Lithopone				
Albalith, black label—11 lb.		.04½	@	.04¾
Azolith	lb.	.04½	@	.04¾
Rayox	lb.			
Titanium oxide	lb.	.17	@	.19
Titanox B	lb.	.06	@	.06½
Titanox C	lb.	.06	@	.06½
Zinc Oxide—American Process				
American Azo:				
ZZZ (lead free)	lb.	.05	@	.05¼
ZZ (leaded)	lb.	.04¾	@	.05¼
Anaconda, lead free	lb.	.05	@	.05¼
Horsehead Lead Free Brand:				
Special—3	lb.	.05	@	.05¼
XX Red—4	lb.	.05	@	.05¼
XX Red—72	lb.	.05	@	.05¼
XX Red—78		.05	@	.05¼
XX Red—103	lb.	.05	@	.05¼
U. S. P.—X, bbls.	lb.	.08	@	.08¼
Kadox, black label—15	lb.	.05	@	.05¼
Blue label—16	lb.	.05	@	.05¼
Red label—17	lb.	.05	@	.05¼
St. Joe, black label	lb.	.05	@	.05¼
green label	lb.	.05	@	.05¼
red label	lb.	.05	@	.05¼
Zinc Oxide—French Process				
Florence White seal—7 bbls.	lb.	—	@	.06¾
Green seal—8	lb.	.06	@	.06¼
Red seal—9	lb.	.05½	@	.05¾
Yellows				
Chrome	lb.	.15	@	.16
Ocher, dom. med.	lb.	.02¼	@	—

BLACKS

Arrow "Aerfloted" Specification	lb.	.0535	@	.0825
Bone, powdered	lb.	.05½	@	.12½
Carbon, compressed	lb.	.0535	@	.0825
uncompressed	lb.	.0535	@	.0825
"Certified," Cabot	lb.	.0535	@	.0825
Spherons	lb.	.0535	@	.0825
"Disperso"	lb.	.0535	@	.0825
Drop, bbls.	lb.	.05½	@	.14
"Excello," compressed	lb.	.0535	@	.0825
"Fumonex"	lb.	.03	@	.07
"Gastex"	lb.	.03	@	.07
Lampblack	lb.	.07	@	.12
"Micronex"	lb.	.0535	@	.0825
"Supreme"	lb.	.0535	@	.0825
Thermatomic—"P 33"	lb.	—	@	—
"Thermax"	lb.	—	@	—
United "Dixie" & "Kosmos"	lb.	.0535	@	.0825

COMPOUNDING MATERIALS

Aluminum Flake	ton.	21.85	@	24.50
Ammonia carbonate, lump	lb.	.10½	@	.12
Asbestine	ton	14.00	@	15.00
Barium carbonate (98-100%)	ton	56.50	@	61.50
Barium Dust	lb.	.05	@	.06
Barytes	ton	22.00	@	24.00
Basofor	lb.	.04½	@	—
Bentonite	lb.	.02	@	.03
Blanc fixe dry f.o.b. works	ton	70.00	@	75.00
Calcene	ton	37.50	@	45.00
Catalpo (fact.)	lb.	.02	@	—
Chalk, precipitated				
Suprex white, extra lt.	ton	45.40	@	60.00
heavy	ton	45.00	@	55.00
Clay, Kaolin, domestic	ton	7.50	@	15.00
Aerfloted, Suprex	ton	8.50	@	10.00
Congaree	ton	9.00	@	—
Dixie	ton			
Dixie, Jr.	ton			
McNamee	ton			
Par	ton			
Tensulite		15.00	@	—
Witco	ton	8.50	@	9.00
Cotton Flock	lb.	.10½	@	.18
Glues, extra white	lb.	.28	@	.30
medium white	lb.	.14	@	.19
Kalite No. 1	ton	30.00	@	55.00
Kalite No. 3	ton	40.00	@	65.00
Magnesium carbonate	lb.	.08	@	—
Mica	ton	65.00	@	80.00
Pyrax A	ton	—	@	—
Rottenstone (powdered)	lb.	.02½	@	.05
Soapstone, powdered	ton	16.00	@	22.00
Starch, powdered	cwt.	3.56	@	3.76
Talc, domestic	ton	12.00	@	15.00
Whiting, commercial	ton	17.00	@	18.00
Columbia Filler	ton	9.00	@	14.00
English Cliffstone	ton	33.00	@	43.00
Sussex	ton			
Witco	ton	15.00	@	—
Wood Flour	ton	18.00	@	30.00
Zinc Carbonate	lb.	.10½	@	.11
Zinc Stearate	lb.	.26	@	—

MINERAL RUBBER

Black Diamond	ton	27.00	@	—
Genasco, solid (factory)	ton	25.00	@	27.00
Hard Hydrocarbon	ton			
Parmr, solid	ton	25.00	@	28.00
Pioneer, MR, solid	ton			
Pioneer-granulated	ton			

SPECIALTIES

Aromatics—Rodo	lb.			
Para-Dors No. 5145	lb.	2.00	@	—
Sunproof	lb.	.35	@	.37½
Sponge Paste	lb.	—	@	.80
Tonox	lb.	.56	@	.60

SOFTENERS

Acids				
Acetic, 28%, bbls.	100 lb.	2.45	@	2.70
glacial, USP, bbls.	100 lb.	14.00	@	—
Nitric, 36 degrees	cwt.	5.00	@	6.00
Sulfuric, 66 degrees	ton	15.50	@	16.50
Acids, Fatty				
Laurex	lb.	.15	@	.16
Stearex	lb.	.08½	@	.13
Stearic, double pressed	lb.	.09	@	.14
Stearite	lb.	.08	@	—
Alkalies				
Caustic Soda, 76%	cwt.	3.60	@	3.75
Soda Ash, 58% C.L.	cwt.	2.52	@	—
Oils				
Corn, refined, bbls.	lb.	.12½	@	—
Cottonseed, crude	gal.	.093	@	.10
Cycline Oil	gal.	.15	@	.28
Degras (c.l. 100 bbls.)	lb.	.02¼	@	—
Less c.l. (10-25 bbls.)	lb.	.03	@	—
Lots less than 10 bbls.	lb.	.03¼	@	—
Fluxrite	lb.	.05½	@	.06½
Palm Lagos	lb.	.05	@	—
Niger	lb.	.04¾	@	—
Para-Flux	gal.	.17	@	—
Petrolatum, light	lb.	.02	@	.02½
Pigmentaroil, tank cars	gal.	.16	@	—
in drums	gal.	.22	@	.23½
Pine, steam distilled	gal.	.64	@	.65
dest. dist., drums	gal.	.40	@	.45
Rosin Oil, cmpd.	gal.	.40	@	—
Rubtack	lb.	.40	@	—
Seedine, c.l.	lb.	.07¼	@	—
Tackol	lb.	.08½	@	.18
Witco Palm Oil	lb.	.05	@	—
Witco Softener (f.o.b. wks.)	gal.	.15	@	—
Woburn No. 8, c.l.	lb.	.06	@	—
Wobonite, c.l.	lb.	.05	@	—
Resins and Pitches				
Pitch, Burgundy	lb.	.07	@	.08
coal tar	gal.	.07½	@	.08
hardwood	ton	25.00	@	30.00
pine, 200 lb. gr. wt.	bbl.	6.50	@	—
Rosin, grade K, 280 lb.	bbl.	5.55	@	—
Pigmentar, tank cars	gal.	.19	@	—
in drums	gal.	.25	@	.27
R. S. L. Resin	lb.	—	@	—
Retort Pine Tar, drums	bbl.	12.00	@	13.00
Solvents				
Acetone, pure	lb.	.12½	@	.13½
Alcohol, denatured, methanol, No. 1 bbls.	gal.	.29½	@	—
Benzene, 90%	gal.	.15	@	.24
Beta-Trichlorethane	gal.	—	@	—
Bondogen	lb.	—	@	—
Carbon, bisulfide	lb.	.05½	@	.06
Carbon, tetrachloride	lb.	.05	@	.05¾
Dichlorethylene	lb.	.29	@	—
Dipentene, cml., drums	gal.	.41	@	.44
Dryolene (f.o.b. Okla.)	gal.	.10	@	.10½
Ethylene dichloride	lb.	.05½	@	.06½
Gasoline, steel bbls.	gal.	.16	@	—
Naphtha, solvent	gal.	.26	@	.31
Plastogen	lb.			
Reogen	lb.			
Rub-Sol (f.o.b. Okla.)	gal.	.09	@	—
Trichlorethylene	lb.	—	@	.09½
Turpentine, spirits	gal.	.46½	@	.50½
dest. dist., drums	gal.	.45	@	.48
Waxes				
Beeswax, white	lb.	.40	@	.41
Carnauba, yellow	lb.	.39	@	.40
Ceresin, white, dom.	lb.	.08	@	.11
Montan, crude	lb.	.10	@	.11
Paraffin (c.l.—f.o.b. N. Y.)				
Yellow crude scale	lb.	.02	@	.02½
White crude scale 124/126	lb.	.02	@	.02½
Refined, 125/127	lb.	.03¾	@	.04

ANTI-OXIDANTS

AgeRite, Gel	lb.			
HP	lb.			
Powder	lb.			
Resin	lb.			
White	lb.			
Albasan	lb.	.70	@	.75
Antox	lb.			
B-L-E	lb.	.57	@	.60
Flectol-H	lb.	—	@	—
Flectol White	lb.	—	@	—
Flectol B	lb.	—	@	—
Neozone	lb.			
Oxynone	lb.	.66	@	.90
Retardex	lb.	.35	@	.40
Stabilite	lb.	.57	@	.62
Stabilite Alba	lb.	.70	@	.75
VGB	lb.	.55	@	.60

MOLD LUBRICANTS

Aresklene	lb.	—	@	—
Cocoa Soapstock	lb.	.06	@	.08
Dipex	lb.	.06	@	.08
Laurex	lb.	.24	@	.30
Rusco, f.o.b. Nitro	lb	.12	@	.30
Sericite, f.o.b. N. Y.	ton	65.00	@	—
Soap Tree Bark, cut, sifted	lb.	.06	@	.08
Zip (Mold Wash)	lb.	—	@	—

FACTICE OR RUBBER SUBSTITUTES

Amberex	lb.	.26	@	—
Black	lb.	.08½	@	—
White	lb.	.08	@	.12
Brown	lb.	.08	@	.14
Duphax	lb.	.11	@	—

VULCANIZING INGREDIENTS

Sulfur Chloride, yellow (drs.)	lb.	.03½	@	.04
Sulfur flour				
Refined, 100% pure (bags)	cwt.	3.45	@	—
Commercial (bags)	cwt.	1.95	@	2.80
Tellov	lb.			
Vandex	lb.			

Crude Rubber
Latex and Guayule
Reclaimed Rubber
Tires and Tubes

STATISTICS OF THE INDUSTRY

Rim Production
Automobiles
Gasoline
Cotton Prices

U. S. Imports and Exports of Crude Rubber

YEARS	Gross Imports: Long Tons	Gross Imports: Total Declared Value	Gross Imports: Average Declared Value per pound Cents	Re-exports: Long Tons	Re-exports: Total Declared Value	Re-exports: Average Declared Value per pound Cents	Net Imports: Long Tons
1922	301,076	101,843,188	15.10	4,809	1,921,828	17.84	296,267
1923	309,144	185,060,304	26.72	8,772	5,672,319	28.87	300,372
1924	328,056	174,231,331	23.71	10,309	6,057,637	26.23	317,747
1925	396,642	429,705,014	48.36	14,827	19,847,753	59.76	381,815
1926	413,338	505,817,807	54.63	17,671	22,470,583	56.77	395,667
1927	426,258	339,874,774	35.60	27,775	24,735,488	39.76	398,483
1928	439,731	244,854,973	25.03	32,159	18,128,361	25.17	407,572
1929	560,084	239,178,783	19.15	36,485	16,868,733	20.64	523,599
1930	482,082	139,134,330	12.89	30,205	9,316,205	13.77	451,877
1931	497,138	72,918,949	6.54	25,595	4,255,472	7.42	471,543
1932	409,584	31,936,459	3.47	20,929	2,015,612	4.30	388,655
1933	407,817	44,034,064	4.82	20,537	2,601,352	5.65	427,280
1934	449,322	97,898,519	9.73	23,848	5,770,109	11.23	425,615
1935	453,135	115,299,448	11.36	11,389	3,084,331	12.09	441,746
1934:							
Jan.	47,963	7,403,123	6.89	1,975	352,116	7.96	45,988
Feb.	34,335	5,262,711	6.84	2,133	476,232	9.97	32,202
Mar.	41,119	6,765,173	7.34	2,947	583,313	8.83	38,172
April	43,841	8,232,746	8.37	2,814	588,453	9.18	41,027
May	48,494	10,001,239	9.21	2,389	544,212	10.17	46,105
June*	47,289	10,747,464	10.14	2,012	501,499	11.33	45,277
July	41,443	9,670,617	10.41	2,366	660,199	13.99	39,077
August	31,531	7,873,690	11.15	1,393	400,433	12.83	30,138
Sept.	31,074	8,293,859	11.92	1,665	474,446	12.72	29,409
Oct.	28,318	8,203,447	12.93	2,058	620,754	13.46	26,260
Nov.	36,325	10,470,076	12.87	1,230	327,672	11.89	35,095
Dec.	17,590	4,974,374	12.62	866	240,780	12.46	16,724
1935:							
Jan.	39,675	10,852,308	12.21	977	278,229	12.72	38,698
Feb.	47,271	12,291,242	11.61	1,845	480,440	11.62	45,426
March	45,350	11,801,152	11.62	1,868	486,379	11.62	43,482
April	39,735	10,096,487	11.34	1,096	285,903	11.64	38,639
May	29,278	7,171,025	10.98	793	202,402	11.39	28,485
June	31,240	7,523,598	10.75	524	153,595	13.10	30,716
July	46,987	11,666,577	11.08	489	132,173	12.06	46,498
August	40,249	10,419,056	11.56	476	130,464	12.23	39,773
Sept.	34,659	8,637,048	11.12	468	120,438	11.48	34,191
Oct.	35,091	8,742,222	11.12	651	188,518	12.92	34,440
Nov.	25,050	6,137,160	10.94	380	101,793	11.95	24,670
Dec.	38,417	9,930,710	11.54	1,821	523,997	12.85	36,596

* Revised.
Note: Total 1935 figures (revised) subject to further revision.

United States Imports of Guayule, Balata, Jelutong, Liquid Latex

(All Quantities in Long Tons)

	Guayule Tons	Guayule Dollars	Balata Tons	Balata Dollars	Jelutong Tons	Jelutong Dollars	Liquid Latex (1) Tons	Liquid Latex (1) Dollars
1924	1,356	536,392	464	568,456	6,165	1,237,100	2,157	864,059
1925	3,781	1,803,448	517	574,750	6,749	1,642,531	3,853	3,537,810
1926	4,305	2,562,096	354	327,213	7,263	3,127,757	3,388	4,680,386
1927	5,018	2,674,957	582	447,246	7,785	2,448,657	1,116	876,077
1928	3,075	1,755,685	731	430,855	7,552	2,540,059	4,167	2,185,579
1929	1,231	545,175	728	566,964	8,203	2,458,136	3,728	1,787,997
1930	1,096	347,388	501	422,684	5,907	1,403,244	4,449	1,506,804
1931	—	—	1,208	411,692	5,777	1,019,010	4,650	884,355
1932	—	—	708	147,403	4,607	616,596	5,085	601,999
1933	—	—	1,658	2,261,869	5,989	944,895	11,085	1,833,671
1934	402	75,349	1,054	438,209	4,988	943,752	13,070	3,633,253
1935	468	86,835	626	188,384	5,747	1,063,126	13,553	3,782,222
1935:								
Jan.	—	—	81	34,687	448	80,097	848	287,583
Feb.	—	—	62	20,981	222	33,850	573	179,583
March	—	—	57	15,917	488	80,643	1,290	354,654
April	—	—	51	11,452	419	58,429	1,721	415,100
May	51	9,464	62	12,931	332	51,805	1,427	380,844
June	105	19,502	75	23,809	330	50,165	591	152,665
July	51	9,800	49	15,758	388	62,736	1,144	303,518
August	50	9,464	31	8,963	445	82,179	1,234	370,431
Sept.	18	3,245	29	6,090	1,682	407,418	1,048	291,652
Oct.	48	8,112	27	7,641	208	33,262	1,287	342,101
Nov.	70	11,931	39	11,706	269	50,657	1,023	261,668
Dec.	91	15,317	62	18,269	414	71,885	1,395	391,386

(1) Weight given in pounds of dry rubber contained in latex.
Note: Total 1935 figures (revised) subject to further revision.

U. S. Consumption of Crude Rubber

(Rubber Manufacturers' Association statistics raised to 100 per cent—All figures in long tons)
(All Quantities in Long Tons)

	Figures on Monthly Basis: 1928	1929	1930	1931	1932	1933	1934	1935
Jan.	34,403	43,002	36,194	28,557	29,648	22,645*	39,190*	47,103
Feb.	33,702	41,594	33,302	28,797	31,821	21,392*	40,515*	43,187
Mar.	35,688	44,730	35,540	32,788	29,505	17,483*	47,003*	42,620
Apr.	32,772	47,521	39,686	33,321	27,518	25,928	44,853*	44,714
May	37,333	49,233	39,386	37,817	30,957	44,074	42,918*	41,568
June	37,676	43,227	34,195	37,916	41,475	50,743*	40,147*	36,623
July	37,407	41,526	29,508	31,397	29,976	49,614*	32,553*	36,384
Aug.	42,927	38,274	30,850	27,586	23,721	44,428*	33,216*	39,242
Sept.	39,882	34,707	25,515	23,638	23,847	35,281*	30,258*	37,553
Oct.	40,857	34,800	27,516	22,277	22,286	31,543*	31,253*	42,436
Nov.	37,461	27,659	23,691	22,943	23,231	28,831*	34,748*	42,778
Dec.	31,232	25,531	21,687	21,409	18,015	28,757*	36,569*	42,942
Tot.	441,340	469,804	375,980	348,986	332,000	400,719*	453,223*	497,150

* Revised.

Reclaimed Rubber in the United States

(All Quantities in Long Tons)

Year	Production	Consumption: Tons	Consumption: % to Crude	Stocks*	Year	Production	Consumption: Tons	Consumption: % to Crude	Stocks*
1926	180,582	164,500	45.9	23,213	1931	133,351	124,126	33.9	19,257
1927	189,144	178,471	47.6	24,980	1932	75,608	77,504	23.4	16,354
1928	208,516	223,000	50.4	24,785	1933	99,560	81,602	19.9	20,746
1929	218,954	226,588	48.4	27,464	1934	110,010	100,597	22.2	23,079
1930	157,967	153,497	40.8	22,006	1935	122,948	112,712	22.7	25,069

	Figures on Monthly Basis: Production	Consumption: Tons	Consumption: % to Crude	Stocks*		Production	Consumption: Tons	Consumption: % to Crude	Stocks*
1934:									
Jan.	9,828	7,000	17.8a	24,263	July	9,446	8,175	25.1a	24,926
Feb.	9,504	7,646	18.9a	23,356	Aug.	8,160	8,493	25.5	24,607
Mar.	11,479	9,683	20.6	25,113	Sept.	6,974	7,028	23.2	24,540
Apr.	10,185	9,387	20.9	22,033	Oct.	8,145	8,167	26.1	24,511
May	10,848	9,500	22.1	22,887	Nov.	7,268	7,775	22.3	23,999
June	10,820	9,459	23.5	23,664	Dec.	7,353	8,284	22.6	23,079
1935:									
Jan.	10,465	11,261	23.9	22,291	July	8,421	8,396	23.1	17,810
Feb.	10,072	9,374	23.3	22,989	Aug.	9,557	8,795	22.4	18,272
Mar.	10,549	9,741	22.9	20,637	Sept.	9,041	8,764	23.4	18,260
Apr.	10,315	10,466	23.4	18,716a	Oct.	11,926	9,662	22.8	19,640
May	10,223	9,938	23.9	18,541	Nov.	11,482	9,084	21.2	21,478
June	8,590	8,710	23.8	17,932	Dec.	12,307	8,521	19.8	25,069

* Stocks on hand at the end of month or year.
a Revised.

U. S. Consumption of Gasoline

(Bureau of Mines Statistics)
(In Thousands of Barrels of 42 Gallons)

	1933 *	1934 *	1935		1933 *	1934 *	1935
January	26,397	29,489	28,062	August	37,400	39,105	42,836*
February	23,320	25,310	26,432	September	34,580	34,669	37,862
March	28,123	30,577	31,997	October	33,022	37,674	41,401
April	29,791	32,736	36,076	November	30,312	34,998	35,956
May	33,709	38,071	39,089	December	28,572	30,581	33,734
June	37,699	36,430	37,884				
July	34,087	37,466	41,203	Total	377,003	407,106	432,556

* Revised on basis of final annual figures issued by Bureau of Mines.

Rims Inspected and Passed in U. S.

(Tire and Rim Association Reports)

	Total		Total		Total
1924	21,863,311	1928	24,247,282	1932	6,261,336
1925	26,001,664	1929	24,141,502	1933	8,713,962
1926	24,199,524	1930	17,364,096	1934	12,255,118
1927	19,700,003	1931	11,253,800	1935	18,664,356

1935:		1935:		1935:	
January	1,868,723	May*	1,562,074	September*	1,052,274
February	1,616,398	June	1,428,314	October*	1,649,288
March*	1,725,629	July	1,339,353	November	1,804,473
April	1,907,032	August*	798,888	December	1,911,910

* Revised.

Daily Spot Closing Prices of Ribbed Smoked Sheet Rubber—*New York Market, in Cents per Pound*

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Ave.
1933																																
November	7 11/16	7 7/8	8	8 5/8	9	8 1/16	8 1/16	8 1/16	8 3/8	8 5/8	8 5/8	8 5/8	8 3/4	8 5/8	9	9 1/16	9 1/16	8 7/8	9	9 1/16	9	9 1/16	9 1/16	9 1/16	9 1/16	9 1/16	9 1/16	8 5/8	9 1/16	9	9 1/16	8 3/4
December	9 1/4	9 1/4	—	9 1/4	9 1/16	8 1/8	9 1/16	8 1/16	8 3/8	8 5/8	8 5/8	8 5/8	8 3/4	8 5/8	9	9 1/16	8 7/8	8 7/8	8 1/4	8 1/4	9	9 1/16	8 1/8	8 1/8	9 1/16	—	8 7/8	8 7/8	9	—	—	—	8 3/4
1934																																
January	—	9	8 1/8	9	9	9	10 3/16	8 3/4	8 3/4	8 7/8	8 7/8	8 7/8	8 7/8	8 7/8	9 1/16	9 1/16	9 1/16	9 1/16	9 1/16	9 1/16	9 1/4	—	9 1/16	9 1/16	9 1/16	9 1/4	9 1/16	10 1/16	10	10	—	10	9 3/16
February	9 3/16	9 1/4	—	—	10 1/16	10 1/16	10 3/16	10 1/16	10 1/16	10 1/16	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	10 1/16	10 1/16	—	—	—	—	10 1/16
March	10 1/16	10 1/2	—	11 1/16	10 1/16	10 1/16	10 3/16	10 1/16	10 1/16	10 1/16	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	10 1/16	10 1/16	—	—	—	—	10 1/16
April	11 3/16	11 3/16	—	11 3/16	11 3/16	11 3/16	11 7/16	11 3/16	11 3/16	11 3/16	11 3/16	11 3/16	11 3/16	11 3/16	11 3/16	11 3/16	11 3/16	11 3/16	10 7/16	11 3/16	11 3/16	11 3/16	11 3/16	11 3/16	11 3/16	11 3/16	11 3/16	11 3/16	11 3/16	11 3/16	11 3/16	11 3/16
May	14 5/16	14 3/8	—	15	15 1/16	15 1/16	15 1/16	15 1/16	14 3/4	13 3/4	13 3/4	13 3/4	13 3/4	13 3/4	13 3/4	13 3/4	13 3/4	13 3/4	13 3/4	13 3/4	13 3/4	13 3/4	13 3/4	13 3/4	13 3/4	13 3/4	13 3/4	13 3/4	13 3/4	13 3/4	13 3/4	13 3/4
June	13	13	—	12 15/16	13	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16
July	14	14 1/16	—	14 1/16	14 1/16	14 1/16	14 1/16	14 1/16	14 1/16	14 1/16	14 1/16	14 1/16	14 1/16	14 1/16	14 1/16	14 1/16	14 1/16	14 1/16	14 1/16	14 1/16	14 1/16	14 1/16	14 1/16	14 1/16	14 1/16	14 1/16	14 1/16	14 1/16	14 1/16	14 1/16	14 1/16	14 1/16
August	14 1/16	14 1/16	15	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16
September	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
October	14 1/16	14 1/16	13 7/16	14	13	13	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16
November	13 1/16	13 1/16	13 1/16	13	13	13	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16
December	13 1/16	—	12 7/8	13	13	13 1/16	13 1/16	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1935																																
January	—	13 1/16	13 5/16	—	13 1/16	13 1/16	13 1/16	13 1/16	13 3/16	13 3/16	13 3/16	13 3/16	—	13 1/4	12 7/8	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	—	13	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16
February	12 3/4	12 3/4	—	12 3/4	12 3/4	12 3/4	12 3/4	12 3/4	13	13	13	13	13	13	12 7/8	13	13	13	13	13	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16
March	12 3/4	12 3/4	—	12 3/4	12 3/4	12	12 1/16	12 3/4	12	11 3/4	11 3/4	11 3/4	11 3/4	11 3/4	11	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16
April	11 3/16	11 3/16	—	11 3/16	11 3/16	11	11 1/16	11 3/16	11 3/16	11 3/16	11 3/16	11 3/16	11 3/16	11 3/16	11 3/16	11 3/16	11 3/16	11 3/16	11 3/16	11 3/16	11 3/16	11 3/16	11 3/16	11 3/16	11 3/16	11 3/16	11 3/16	11 3/16	11 3/16	11 3/16	11 3/16	11 3/16	11 3/16
May	11 7/16	11 7/16	—	11 7/16	11 7/16	11 1/2	11 7/16	11 7/16	11 7/16	11 7/16	11 7/16	11 7/16	11 7/16	11 7/16	11 7/16	11 7/16	11 7/16	11 7/16	11 7/16	11 7/16	11 7/16	11 7/16	11 7/16	11 7/16	11 7/16	11 7/16	11 7/16	11 7/16	11 7/16	11 7/16	11 7/16	11 7/16	11 7/16
June	12 1/16	12 1/16	—	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16
July	12 1/16	12 1/16	—	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16
August	12 1/16	12 1/16	—	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16
September	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
October	11 1/8	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16
November	13 1/16	13 1/16	12	13 1/16	12 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16
December	13 1/16	—	12 3/4	12 7/8	13	13	13 1/16	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1936																																
January	—	13 1/16	13 3/16	13 3/16	—	—	13 3/16	13 1/16	13 1/16	13 7/16	14	14 1/8	—	14 1/8	14 1/8	14 1/16	14 1/16	14 1/16	14 1/8	—	14 3/16	14 1/2	14 5/8	14 1/2	15	15	—	15 1/8	14 1/2	14 1/2	14 1/2	14 1/2
February	15 1/16	—	15 1/8	15 1/16	15 1/16	—	15 1/16	15 1/4	—	15 3/16	15 3/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16

Average Spot Closing Prices—Ribbed Smoked Sheets

(New York Market)

Average Price per Pound for Years 1910-1929

Year	Cents	Year	Cents	Year	Cents	Year	Cents	Year	Cents
1910	206.60	1914	65.33	1918	60.15	1922	17.50	1926	48.50
1911	141.30	1915	65.85	1919	48.70	1923	29.45	1927	37.72
1912	121.60	1916	72.50	1920	36.30	1924	26.20	1928	22.48
1913	82.04	1917	72.23	1921	16.36	1925	72.46	1929	20.55

Average Monthly Price per Pound Since 1928

	1930 Cents	1931 Cents	1932 Cents	1933 Cents	1934 Cents	1935 Cents	1936 Cents
Jan.	15.24	8.34	4.38	3.08	9.32	13.10	14.35
Feb.	15.85	7.70	4.03	2.95	10.45	12.92	
Mar.	15.34	7.71	3.35	3.01	11.01	11.51	
Apr.	14.93	6.43	3.02	3.56	12.10	11.55	
May	14.24	6.49	3.09	4.95	13.26	12.05	
June	12.45	6.35	2.66	6.15	13.51	12.57	
July	11.24	6.37	2.89	8.01	14.60	12.10	
Aug.	9.96	5.38	3.63	7.31	15.47	11.98	
Sept.	8.28	5.08	3.84	7.30	15.36	11.55	
Oct.	8.20	4.87	3.65	7.64	13.96	12.62	
Nov.	9.01	4.65	3.44	8.66	13.04	13.15	
Dec.	9.05	4.64	3.24	8.87	12.98	13.28	
Average for Year	11.98	6.17	3.49	5.96	12.92	12.37	

London Closing Prices of Ribbed Smoked Sheets

(In Pence Per Pound)

Day	Nov.	Dec.	Jan.	Feb.	Day	Nov.	Dec.	Jan.	Feb.
1	6 5/8	—	—	6 13/16	17	—	6 7/8	6 7/8	
2	6 3/8	6 1/4	6 7/16	—	18	6 7/8	6 3/8	6 3/8	
3	—	6 7/8	6 5/8	7	19	6 7/8	6 3/8	—	
4	6 5/8	6 3/4	6 7/8	7	20	6 7/8	6 3/8	6 3/8	
5	6 3/8	6 5/8	—	7	21	6 7/8	6 7/8	—	
6	6 3/8	6 5/8	6 5/8	7 1/8	22	—	6 7/8	6 3/8	
7	6 7/16	6 5/8	6 5/8	7 1/8	23	6 7/8	—	6 3/8	
8	6 7/16	—	6 11/16	7 1/4	24	—	6 3/8	6 3/8	
9	6 3/8	6 5/8	6 11/16	—	25	6 1/4	—	—	
10	—	6 7/8	6 3/4	7 1/8	26	6 1/4	—	7	
11	6 7/8	6 7/8	6 3/4		27	6 7/8	6 3/8	—	
12	6 7/8	6 7/8	—		28	6 7/8	—	—	
13	6 7/8	6 7/8	6 3/4		29	6 7/8	—	6 3/8	
14	6 3/8	—	6 3/4		30	6 3/8	6 7/8	6 3/8	
15	6 3/8	—	6 13/16		31	—	6 1/2	6 3/8	
16	6 5/8	6 5/8	6 7/8						

Average Monthly Price Per Pound

Month	1933 Pence	1934 Pence	1935 Pence	1936 Pence
Jan.	2.264	4.429	6.434	6.758
Feb.	2.093	4.920	6.292	
Mar.	2.099	5.136	5.745	
Apr.	2.323	5.712	5.604	
May	2.966	6.207	5.822	
June	3.392	6.245	6.027	
July	3.860	7.053	5.801	

Month	1932 Pence	1933 Pence	1934 Pence	1935 Pence
Aug.	2.654	3.811	7.401	5.696
Sept.	2.485	3.728	7.409	5.508
Oct.	2.425	3.957	6.806	6.130
Nov.	2.518	4.096	6.294	6.308
Dec.	2.444	4.200	6.295	6.340
Average for Year	2.434	3.233	6.159	5.976

Spot Closing Cotton Prices

(Middling Upland Grade—New York Market)

Recent Daily Price Per Pound

Date	Dec.	Jan.	Feb.	Date	Dec.	Jan.	Feb.	Date	Dec.	Jan.	Feb.
1	——	11.60		11	11.80	11.95		22	——	11.95	
2	12.20	12.20	——	12	11.85	——		23	12.05	11.95	
3	12.35	12.10	11.75	13	12.00	11.95		24	12.00	11.85	
4	12.25	12.10	11.60	14	11.90	11.95		25	——	11.95	
5	12.20	——	11.45	15	——	11.85		26	11.90	——	
6	12.20	12.15	11.60	16	11.65	11.80		27	11.90	11.90	
7	12.20	11.80	11.65	17	11.80	11.85		28	11.90	11.80	
8	——	11.90	11.65	18	11.75	11.85		29	——	11.85	
9	12.05	11.85	——	19	11.80	——		30	11.95	11.85	
10	12.10	11.90	11.75	20	11.90	11.85		31	12.10	11.60	
				21	12.05	11.90					

Average Monthly Price Per Pound

	1933 Cents	1934 Cents	1935 Cents	1936 Cents
Jan.	6.23	11.25	12.70	11.91
Feb.	6.05	12.28	12.58	
Mar.	6.39	12.30	11.63	
Apr.	7.02	11.80	11.73	
May	8.64	11.44	12.25	
June	9.47	12.20	11.89	
July	10.76	12.84	12.26	

	1932 Cents	1933 Cents	1934 Cents	1935 Cents
Aug.	7.43	9.55	13.40	11.48
Sept.	6.30	9.64	13.00	10.80
Oct.	6.30	9.58	12.48	11.28
Nov.	6.22	10.04	12.53	12.01
Dec.	6.00	10.17	12.76	11.99
Average for Year	6.41	8.63	12.36	11.88

World Stocks of Crude Rubber

ON HAND OR AFLOAT TO THE U. S.

At End of	ON HAND 1933	ON HAND 1934	ON HAND 1935	AFLOAT 1933	AFLOAT 1934	AFLOAT 1935	ON HAND AND AFLOAT 1933	ON HAND AND AFLOAT 1934	ON HAND AND AFLOAT 1935
Jan.	396,376	368,660	346,084	32,539	45,768	42,066	428,915	414,428	388,150
Feb.	381,794	358,681*	339,335*	32,898	53,063	42,969	414,692	411,744*	382,304*
Mar.	390,135	352,897*	338,700	29,531	54,722	44,485	419,666	407,619*	383,185
Apr.	382,167	351,073*	334,954	30,745	56,251	37,651	412,912	407,324*	372,605
May	364,623	350,935*	319,281	43,342	57,921	44,375	407,965	409,250	363,656
June	333,954	358,461*	320,470	63,608	46,698	55,581	397,562	404,847	376,051
July	326,609	365,072	330,528	57,435	45,869	49,018	384,044	410,941	379,546
Aug.	325,148	363,711*	329,548	53,084	40,278	47,724	378,232	403,989*	377,272
Sept.	334,637	360,623*	326,236	57,255	38,831	43,413	391,982	399,454	369,649
Oct.	343,579	362,571*	317,850	58,568	38,247	49,913	402,147	400,818*	367,763
Nov.	353,852	362,826*	303,162	57,140	38,625	46,588	410,992	401,451*	349,750
Dec.	364,541	355,000*	295,438	55,606	47,644	39,094	419,147	402,644*	334,532

(Rubber Manufacturers' Association figures raised to 100%)

* Revised.

STOCKS IN GREAT BRITAIN

Stocks in London

(No. of Tons in Wharves and Warehouses, including Latex)

At end of	1933	1934	1935	At end of	1933	1934	1935
Jan.	36,481	38,570	81,807	July	41,178	50,490	99,226
Feb.	37,182	38,752	87,605	Aug.	39,480	48,953	101,574
Mar.	40,689	40,501	92,664	Sept.	39,237	56,103	101,198
Apr.	40,911	42,413	94,361	Oct.	37,101	63,079	94,749
May	41,998	42,190	95,722	Nov.	36,139	67,656	90,542
June	43,032	45,674	98,077	Dec.	35,615	72,285	86,551

At End of Recent Weeks

	First Saturday	Second Saturday	Third Saturday	Fourth Saturday	Fifth Saturday
1935					
Oct.	100,635	100,405	97,642	94,560	
Nov.	94,178	90,736	90,145	90,496	90,026
Dec.	88,904	87,090	87,664	87,097	
1936:					
Jan.	86,061	84,463	84,388	84,414	

Stocks in Liverpool

1935					
Oct.	76,746	76,139	76,092	76,070	
Nov.	76,363	76,271	76,154	75,996	76,370
Dec.	76,622	76,546	77,430	77,452	
1936:					
Jan.	77,513	77,550	77,059	77,293	

STOCKS IN PENANG AND SINGAPORE

(Stocks held by Dealers—Quantities in Long Tons)

End of	1932	1933	1934	1935	End of	1932	1933	1934	1935
Jan.	48,850	22,525	40,405	50,588	July	17,017	36,972	65,099	41,266
Feb.	46,954	21,530	41,884	51,628	Aug.	20,649	38,601	59,227	36,117
Mar.	46,591	24,594	47,933	46,046	Sep.	20,415	36,948	54,905	29,122
Apr.	39,663	25,460	48,431	43,295	Oct.	23,158	37,282	54,155	30,111
May	38,690	29,822	76,393	45,625	Nov.	25,419	39,018	49,282	26,513
June	19,770	34,676	73,218	43,866	Dec.	25,341	38,269	51,255	22,385

STOCKS IN OTHER CENTRES

	Malaya Mainland	Holland	Colombo	Para and Manaos
End of 1935:				
Jan.	33,609	1,397	5,926	3,477
Feb.	32,062	1,534	4,753	3,153
Mar.	31,844	1,551	3,917	3,214
Apr.	33,583	1,536	4,245	3,019
May	31,896	1,499	4,910	2,643
June	33,823	1,481	4,659	2,012
July	33,949	1,448	4,700	1,222
August	30,660	1,455	4,866	965
Sept.	29,986	1,442	4,402	1,004
Oct.	29,975	1,440	3,790	
Nov.	29,805	1,550	4,393	
Dec.	30,310	1,553	4,794	

RUBBER STOCKS AFLOAT

	Afloat for United States	Afloat for Europe	All Other * Afloat	Total * Afloat
End of: 1934				
September	38,831	39,630	35,215	113,716
October	38,247	40,560	20,061	98,868
November	38,625	39,870	21,342	99,837
December	47,644	41,200	36,132	124,976
End of: 1935				
January	42,066	35,600	35,334	113,000
February	42,969	28,750	31,281	103,000
March	44,485	30,400	17,115	92,000
April	37,651	31,400	29,949	99,000
May	44,375	30,300	29,325	104,000
June	55,581	27,485	17,934	101,000
July	49,018	29,150	17,832	96,000
August	47,724	32,800	21,476	102,000
September	43,413	31,090	26,497	101,000
October	49,913	29,000	20,087	99,000
November	46,588	25,000	17,412	89,000
December	39,094	22,000	20,906	82,000

* *Total Afloat* is an arbitrary estimate based on 1½ months' shipments as adopted by the Department of Commerce. *All Other Afloat* is determined by subtracting the amount of stocks in transit to the United States and Europe from the estimated total.

P—Preliminary estimate.

U. S. Tire and Tube Statistics[1]

(All Figures Represent Thousands)

AUTOMOBILE CASINGS

Figures for Recent Years

	1927	1928	1929	1930	1931	1932	1933	1934
Production	64,439	77,944	68,726	50,965	48,739	40,085	45,304	47,233
Shipments	64,059	74,296	69,395	53,638	48,151	40,260	44,094	46,687
Inventory[2]	10,264	13,624	11,838	9,003	7,775	7,644	8,888	9,455

Figures for Recent Months

	PRODUCTION 1933	1934	1935	SHIPMENTS 1933	1934	1935	INVENTORY 1933	1934	1935
Jan.	2,258	3,922	4,626	2,597	3,222	3,663	7,237	9,684	10,398
Feb.	2,339	4,335	4,383	2,292	3,285	3,287	7,377	10,725	11,530
Mar.	2,038	5,180	4,346	2,092	4,223	4,204	7,290	11,651	11,675
Apr.	3,123	4,470	4,512	3,654	4,438	5,144	6,778	11,981	11,003
May	5,189	4,456	4,175	5,180	5,332	4,067	6,760	11,127	11,131
June	6,100	4,342	3,910	6,305	5,228	4,262	6,615	10,219	10,755
July	5,714	3,353	3,532	5,497	4,157	5,447	6,844	9,437	8,850
Aug.	4,994	3,533	3,993	4,707	4,308	4,739	7,070	8,697	7,805
Sept.	3,999	2,936	3,787	3,503	3,183	3,303	7,595	8,419	8,288
Oct.	3,249	3,287	4,051	2,537	3,010	4,095	8,462	8,657	8,291
Nov.	3,039	3,341	3,997	2,197	3,191	3,990	9,247	8,779	8,249
Dec.	3,082	3,778		3,531	3,109		8,888	9,455	

AUTOMOBILE INNER TUBES

Figures for Recent Years

	1927	1928	1929	1930	1931	1932	1933	1934
Production	70,823	80,180	68,829	52,420	48,333	36,891	42,546	46,228
Shipments	72,896	77,127	70,592	54,938	50,021	37,911	41,391	45,046
Inventory[2]	13,692	16,117	12,807	9,999	7,922	6,749	7,815	9,180

Figures for Recent Months

	PRODUCTION 1933	1934	1935	SHIPMENTS 1933	1934	1935	INVENTORY 1933	1934	1935
Jan.	2,093	3,530	4,259	2,535	3,199	3,722	6,197	8,403	9,621
Feb.	2,224	4,077	4,171	2,102	3,323	3,362	6,357	8,445	10,466
Mar.	1,883	5,194	4,123	1,902	4,118	4,168	6,369	10,244	10,406
Apr.	2,853	4,735	4,259	3,051	4,342	4,453	6,189	10,585	10,170
May	5,189	4,359	3,892	5,180	4,902	3,451	6,760	10,043	10,615
June	5,448	4,097	3,480	5,778	5,309	4,024	6,097	8,795	10,050
July	5,603	3,531	3,251	5,211	4,323	5,269	6,440	8,053	8,005
Aug.	4,916	3,680	3,894	4,687	4,198	4,556	6,628	7,555	6,939
Sept.	3,827	3,110	4,125	3,472	3,024	3,426	7,008	7,639	7,565
Oct.	3,506	3,219	4,435	2,676	2,689	4,027	7,831	8,151	8,053
Nov.	2,863	3,169	3,942	2,103	2,767	3,747	8,625	8,503	8,161
Dec.	2,631	3,503		3,410	2,850		7,815	9,180	

(1) Rubber Manufacturers' Association figures, raised to 100%. The Association estimates its figures to be 75% complete up until 1929 and 80% complete for 1929-1933. Beginning 1934, the Association reported its figures to be 97% complete.

(2) Held by manufacturers at end of period indicated.

Automobile Production

	United States Total	Passenger Cars	Trucks	Canada Total	Passenger Cars	Trucks	Grand Total
1928	4,357,384	3,826,613	530,771	242,382	196,737	45,645	4,599,944
1929	5,358,420	4,587,400	771,020	263,295	207,498	55,797	5,621,715
1930	3,355,986	2,814,452	540,534	154,192	125,442	28,750	3,510,178
1931	2,389,730	1,973,090	416,640	82,621	63,477	19,144	2,472,351
1932	1,370,678	1,135,493	235,187	60,816	50,718	10,098	1,431,494
1933*	1,920,057	1,573,512	346,545	65,924	53,855	12,069	1,992,126
1934*	2,753,111	2,177,919	575,192	116,852	92,647	24,205	2,869,963
1935	4,009,496	3,285,836	723,660	172,995	139,742	33,253	4,182,491
1935[1]							
Jan.	292,785	229,233	63,552	10,607	8,269	2,338	303,392
Feb.	335,667	275,623	60,044	18,114	13,885	4,229	353,781
March	429,793	361,816	67,977	21,975	18,179	3,796	451,768
April	477,691	401,628	76,063	24,121	20,686	3,435	501,812
May	364,662	307,522	57,140	20,765	17,093	3,672	385,427
June	361,248	296,609	64,639	15,745	12,276	3,469	376,993
July	336,985	276,084	60,901	13,069	9,471	3,598	350,054
Aug.	239,994	182,389	57,605	7,692	5,524	2,168	247,686
Sept.	89,804	57,285	32,519	5,323	3,819	1,504	95,127
Oct.	275,024	214,609	60,415	8,313	7,128	1,185	283,337
Nov.	398,039	338,425	59,614	13,496	12,042	1,454	411,535
Dec.	407,804	344,613	63,191	13,775	11,370	2,405	421,579

* Revised.

[1] Figures for the complete period of 1935 were revised by the Bureau of the Census, Department of Commerce, on January 24, 1936.

Exports of Crude Rubber from Principal Producing Countries

(Long Tons)

	BRITISH MALAYA [1]							DUTCH EAST INDIES [2]							
	Gross Exports	Imports	Gross Exports Minus Imports	Ceylon [3]	India & Burma [3]	Sarawak [4]	British North Borneo [5]	Siam [4]	Java & Madura	Sumatra E. Coast	Other D.E.I.	Indo-China [3]	Amazon Valley	All Other [6]	World Total [7]
1923	252,016	70,432	181,584	39,971	6,416	5,705	4,237	1,718	32,930	46,344	57,822	5,067	16,765	7,856	406,415
1924	259,706	108,524	151,182	39,997	7,697	6,699	4,621	2,962	42,446	54,497	80,347	6,688	23,165	9,065	429,366
1925	316,825	158,022	158,803	49,566	10,082	5,424	5,377	5,377	46,757	65,499	120,626	7,881	25,298	13,797	514,487
1926	391,328	151,243	240,085	58,962	9,874	9,155	6,079	4,027	52,186	71,413	121,231	8,203	24,298	16,017	621,530
1927	371,322	182,845	188,477	55,356	11,321	10,923	6,582	5,472	55,297	77,815	142,171	8,645	28,782	15,633	606,474
1928	409,430	149,787	259,643	57,267	10,790	10,087	6,698	4,813	58,848	82,511	121,770	9,548	21,129	10,690	653,794
1929	574,836	163,092	411,744	81,584	11,663	11,077	7,381	5,018	65,990	87,789	134,037	9,696	21,148	6,767	853,894
1930	547,043	133,876	413,167	76,970	10,782	10,309	6,781	4,251	69,755	79,396	115,254	7,665	14,260	5,651	814,241
1931	519,740	125,506	394,234	61,769	8,470	10,451	6,247	4,218	75,952	87,747	116,009	11,696	12,121	3,292	792,203
1932	478,252	92,539	385,713	48,973	3,888	6,960	4,664	3,451	61,312	79,837	85,871	13,883	6,450	1,816	702,818
1933	573,412	167,377	406,035	63,351	4,527	10,874	7,555	7,765	73,851	91,861	149,659	18,394	9,883	2,737	846,312
1934	627,361	211,803	465,558	79,746	10,492	17,233	11,103	17,545	87,400	112,058	175,470	20,170	8,903	2,985	1,008,663
1935	590,522	176,705	413,817	53,584	13,134	20,850	8,868	28,051	57,479	78,362	135,247	29,949	10,724	4,503	854,568
1934:															
Jan.	55,055	16,128	38,927	6,929	1,531	1,197	805	1,290	6,513	7,975	13,913	1,109	576	127	80,892
Feb.	57,867	15,027	42,840	8,620	775	1,005	805	1,264	6,706	9,211	13,696	1,232	831	105	87,090
March	58,515	19,907	38,608	6,750	1,412	1,360	806	1,363	8,655	10,539	19,084	1,968	846	113	91,504
April	56,748	20,957	35,791	5,157	762	1,447	894	1,311	7,282	9,808	19,250	1,330	440	236	83,708
May	69,403	25,691	43,712	8,870	1,106	1,892	1,397	997	12,104	14,606	26,598	1,243	726	328	113,579
June	53,282	20,981	32,301	5,397	1,425	1,886	644	1,497	4,860	6,192	15,956	1,593	765	377	72,893
July	53,335	22,829	30,506	3,818	710	1,662	1,048	2,399	5,762	7,369	14,415	1,703	353	252	69,997
Aug.	52,641	17,865	34,776	4,948	552	1,714	1,048	1,908	5,340	8,901	11,356	1,610	710	251	73,114
Sept.	61,051	17,889	43,162	6,555	294	1,438	839	1,626	5,722	10,738	14,688	1,665	764	222	87,713
Oct.	47,045	10,226	36,819	6,544	413	1,412	1,196	1,328	5,970	6,643	5,556	1,413	840	401	68,535
Nov.	51,140	8,759	42,381	6,756	501	953	941	1,356	7,621	7,123	5,338	2,356	1,017	334	76,676
Dec.	59,575	15,375	44,200	8,481	990	1,237	680	2,043	10,865	12,953	12,354	2,956	1,035	239	98,033
1935															
Jan.	56,720	17,142	39,578	5,202	2,269	1,630	1,222	2,614	3,812	5,371	8,704	2,650	1,196	460	74,719
Feb.	50,593	17,676	32,917	5,556	731	1,887	760	2,288	4,395	7,663	15,194	2,076	636	254	74,154
Mar.	47,407	13,437	33,970	3,181	701	1,901	773	2,076	5,592	7,950	7,973	1,472	740	526	66,855
Apr.	53,360	16,029	37,331	2,976	370	1,895	846	1,661	5,574	6,873	12,683	2,827	963	185	74,957
May	51,353	23,720	27,633	4,223	674	2,323	848	2,752	6,217	7,931	21,058	2,138	832	315	76,920
June	49,751	18,637	31,114	3,525	1,077	2,031	603	2,869	5,698	8,258	14,168	2,021	659	393	72,416
July	48,975	11,257	37,718	4,106	580	1,870	1,164	1,939	5,899	5,664	8,373	2,015	427	407	70,162
Aug.	51,873	10,978	40,895	5,683	724	759	566	2,062	4,661	6,923	8,875	2,451	1,150	442	74,541
Sept.	51,247	10,418	40,829	3,970	681	1,797	421	2,278	4,089	5,862	9,422	2,248	1,121	493	73,211
Oct.	48,258	19,364	28,894	5,932	1,198	2,168	1,040	2,622	3,937	6,698	16,432	2,748	1,000*	428	73,097
Nov.	43,147	10,518	32,629	4,288	1,806	1,356	455	2,155	3,724	3,963	8,511	2,392	1,000*	300*	62,579
Dec.	37,838	7,529	30,309	4,942	2,323	1,233	171	2,735	3,881	5,206	3,854	4,911	1,000*	300*	60,865

(1) Malayan net exports cannot be taken as production, since imported rubber is largely wet native rubber, which is reduced about one-third in weight by remilling; rubber exported as latex is not included which on a basis of 3½ pounds per gallon amounted to 115 tons in 1923, 1,117 in 1924, 3,618 in 1925, 3,263 in 1926, 2,439 in 1927, 1,437 in 1928, 2,670 in 1929, and 1,274 in 1930. (2) Ceylon Chamber of Commerce statistics until 1926; rubber exported as latex is not included—such shipments were equivalent to 18 tons in 1923, 93 tons in 1924, 6 tons in 1925, 20 tons in 1926, about ½ ton in 1927, and 1 ton in 1928, and practically none in 1929, 1930 and 1931. (3) Official statistics. (4) Imports into Singapore and Penang. (5) Exports from "Other D.E.I." are chiefly wet native rubber, which is reduced about one-third in weight by remilling; rubber exported as latex is not included which on a basis of 3½ pounds per gallon amounted to 2,342 tons in 1923, 1,008 tons in 1924, 2,239 tons in 1925, 44 tons in 1926, 84 tons in 1927, 1,459 tons in 1928, 1,302 tons in 1929, and 2,656 tons in 1930. (6) Calculated from official import statistics of principal consuming countries, viz., United States, United Kingdom, France, Germany, Belgium and Netherlands, and includes guayule rubber. (7) This total includes the third column for British Malaya, "Gross Exports minus Imports," and all the figures shown for the other territories. * Figure is provisional; final figure will be shown when available.

NOTE: THE FIGURES FOR 1933 ARE REVISED AS OF JANUARY 25, 1935 AND REPRESENT FINAL FIGURES

Net Imports of Crude Rubber into Principal Manufacturing Countries

(*Long Tons*)

	United States [1]	United Kingdom	France (h)	Germany	Canada (ac)	Japan (da)	Italy	Russia (ce)	Australia (cd)	Belgium (d)	Netherlands	Scandinavia (abcdf)	Spain (g)	Czechoslovakia (abcd)	World Total
1919	238,407	42,671	17,685	5,584	6,395	9,753	9,894	75	1,002	3,995	2,771	3,149	2,418	9	343,808
1920	249,530	56,844	13,885	11,890	11,746	5,297	6,123	62	1,815	3,840	5,510	2,292	2,008	567	371,409
1921	179,736	42,087	15,135	21,920	8,124	21,713	3,906	165	1,014	1,705	1,022	1,279	2,245	569	300,620
1922	296,594	11,724	24,352	27,546	9,207	15,934	6,430	2,493	2,643	172	—3,807	1,778	589	567	396,222
1923	301,527	12,700	27,392	18,519	13,277	15,372	8,489	2,986	1,649	2,184	792	2,528	630	1,128	409,173
1924	319,103	—11,550	30,446	22,727	14,299	19,571	8,764	2,346	3,124	2,688	—807	3,178	944	1,370	416,203
1925	385,596	4,061	32,956	33,937	19,683	11,117	11,412	7,088	4,757	2,930	875	3,149	1,155	1,558	520,274
1926	399,981	84,865	34,240	22,775	20,229	18,125	9,809	6,529	9,021	2,498	2,670	4,046	1,299	1,870	617,957
1927	403,472	60,249	34,271	38,893	26,405	20,521	11,381	12,018	9,490	6,482	636	4,224	2,055	2,672	632,768
1928	407,572	4,846	36,498	37,855	30,447	25,621	12,433	15,134	8,430	7,958	2,243	4,418	3,178	3,138	599,771
1929	528,608	122,675	55,093	49,275	35,453	34,284	17,169	11,774	15,886	9,445	3,022	6,440	864	4,650	894,638
1930	458,036	120,069	68,503	45,488	28,793	33,039	18,639	16,387	5,354	10,635	2,924	7,710	2,400	4,468	822,445
1931	475,993	86,170	46,466	39,688	25,261	43,483	10,149	30,671	7,649	11,009	2,220	6,360	2,605	7,717	794,641
1932	393,844	44,086	42,506	45,121	20,917	56,027	14,469	30,637	12,576	9,519	2,851	7,262	4,359	9,444	693,618
1933	398,365	73,335	61,953	54,120	19,332	66,831	19,341	29,830	13,534	11,166	1,243	7,831	5,520	10,402	772,803
1934	439,172	158,482	49,560	59,330	28,439	69,905	21,398	47,271	9,642	9,115	3,758	12,418	6,900	10,999	926,389
1935	455,758	128,829	51,450		26,870				9,978		4,068				
1934:															
July	40,308	12,266	4,051	5,494	2,430	5,739	708	1,640	732	810	540	1,602	747	1,094	78,161
Aug.	31,405	13,728	3,660	3,078	1,948	4,945	1,795	6,829	658	669	239	1,033	277	1,495	71,759
Sept.	30,345	11,254	4,244	2,607	2,770	7,346	1,486	4,487	743	501	339	980	465	477	68,044
Oct.	27,323	18,897	3,424	2,148	3,043	7,227	1,296	3,681	798	693	447	813	675	254	70,719
Nov.	35,982	15,875	3,176	3,425	1,568	5,580	1,764	4,488	516	379	187	1,382	542	215	75,079
Dec.	17,305	15,816	3,605	5,207	2,849	3,904	1,979	6,460	1,312	—168	139	1,143	615	762	60,928
1935															
Jan.	39,546	20,383	5,573	4,286	2,670	4,400	1,613	3,446	1,099	419	158	1,252	468	1,245	86,558
Feb.	45,999	15,609	4,593	3,513	1,558	5,582	4,356	1,810	848	399	477	838	567	1,836	87,985
Mar.	44,772	12,810	4,017	6,353	2,710	4,421	1,582	4,624	1,459	240	331	891	630	741	85,581
Apr.	40,061	11,574	3,306	5,820	1,063	6,635	1,653	3,387	1,150	520	329	1,049	432	789	78,115
May	29,962	12,498	3,828	6,049	3,929	5,429	935	1,937	671	982	272	853	815	774	68,934
June	31,410	10,253	3,210	4,551	1,435	3,373	1,831	3,087	496	1,065	446	780	745	604	66,286
July	47,694	9,454	3,247	4,929	1,319	4,484	1,298	1,823	520	572	157	800	548	185	77,030
Aug.	41,057	14,120	4,508	4,790	2,814	4,453	916	1,227	655	528	413	820	752	673	77,726
Sept.	35,256	11,223	3,740	5,453	1,604	3,590	1,696	1,593	449	806	282	1,030	793	914	68,429
Oct.	35,770	3,184	5,175	6,074	812	4,727	2,500*	4,876	829	539	671	1,000	597	742	67,496
Nov.	25,756	2,942	4,731	6,258	4,389	4,361	2,000*	4,858	783	449	245	1,206	1,044	1,276	60,298
Dec.	38,072	4,779	5,522		2,567				1,019		287				

a—Including gutta percha. b—Including balata. c—Re-exports not deducted in monthly statistics. d—Including some scrap and reclaimed rubber. e—Official statistics of rubber imports by Soviet Russia. f—Including Norway, Sweden, Denmark and Finland. g—United Kingdom and French exports to Spain except in years prior to 1925. h—French imports have been reduced 12 per cent in order to eliminate imports of gutta percha and to reduce to basis of net weight. [1] United States imports of guayule are included in this compilation. * Figure is provisional; final figure will be shown immediately it becomes available.

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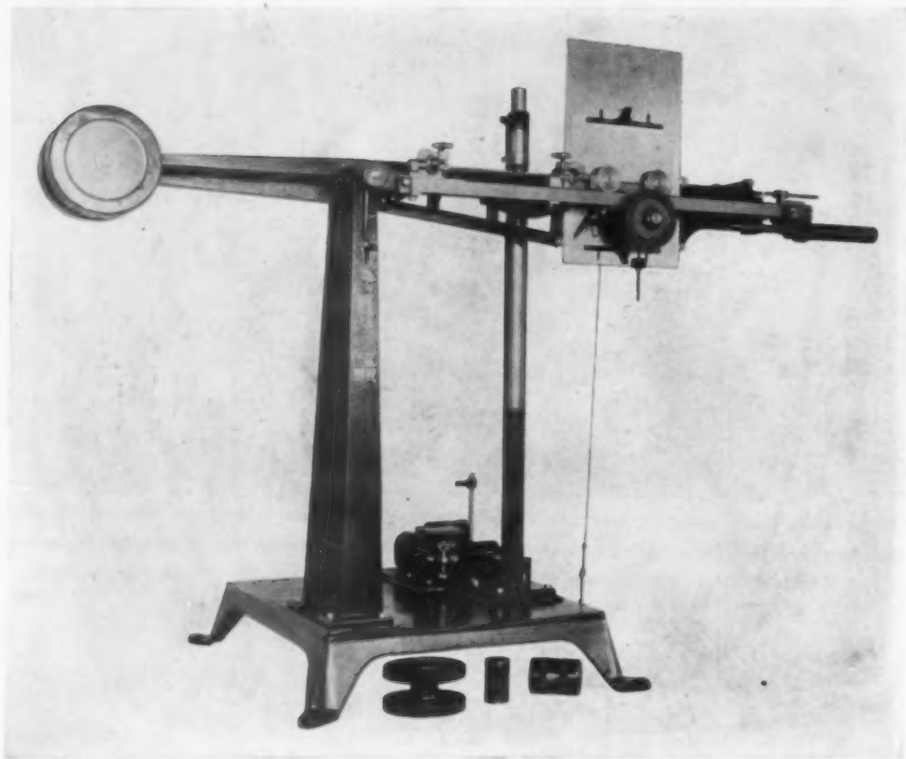

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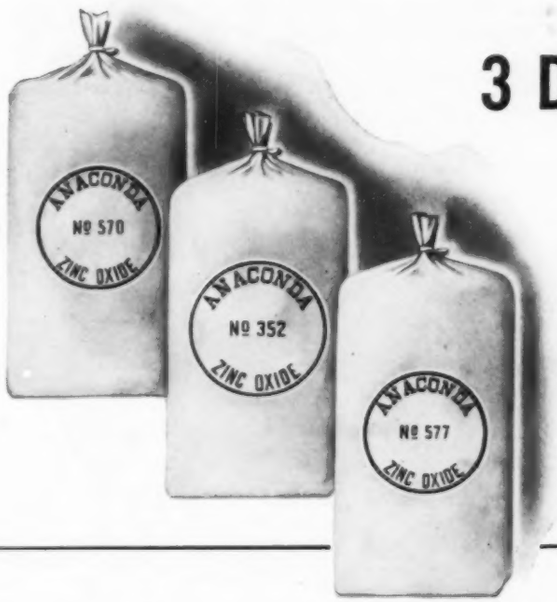

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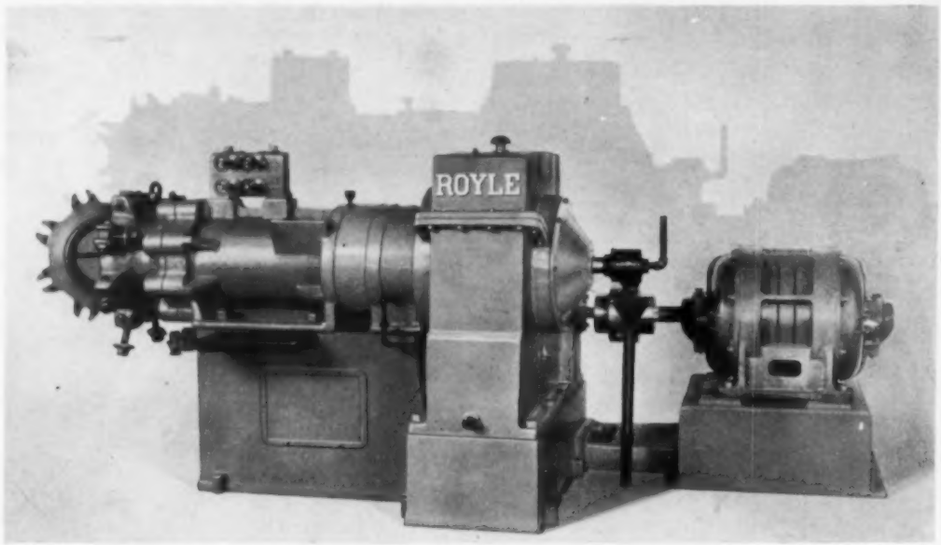

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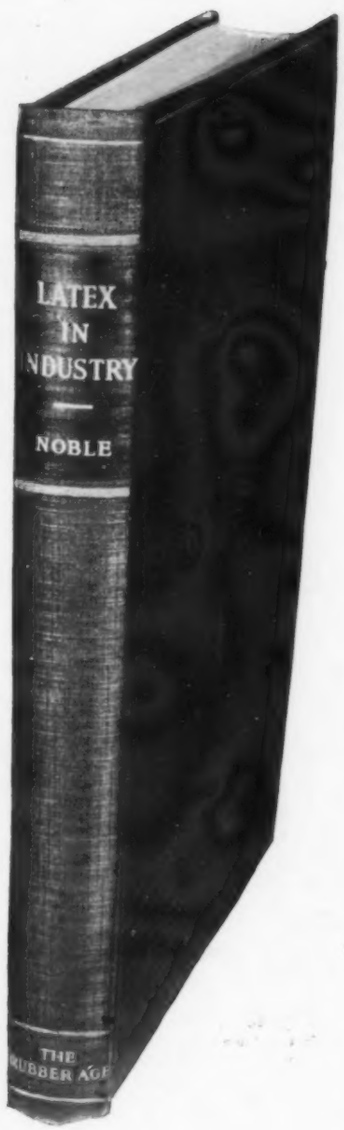
By Royce J. Noble, Ph.D.



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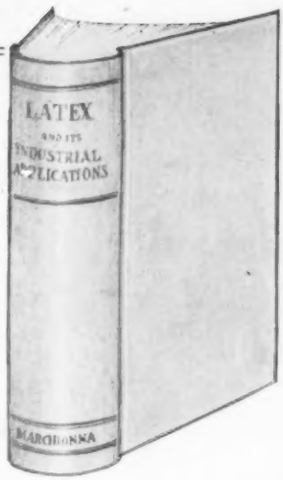

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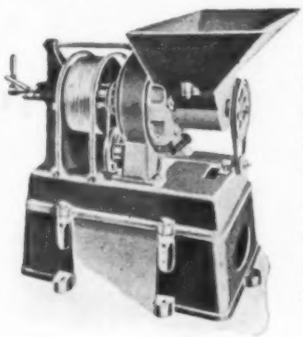

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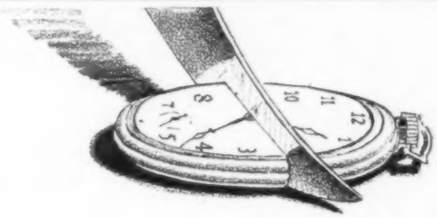

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